The Builder.

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Architectural Studies in France.

IT is not often found that books upon architecture, written in an earlier period of the century, will bear republication thirty or forty years later. Travelling for the sake of architectural study has so much increased of late that what was new to the architectural student in the 'fifties is everybody's property now. The changes in architectural taste and predilection have been so rapid, moreover, that what seems specially worthy of study to one generation is liable to be passed over as of secondary importance by the next one; added to which, the manner of illustrating architecture, both in regard to the special points to be illustrated and the method of delineation, has been even more changeable, and the taste in this latter respect varies by decades rather than by generations. There are monumental illustrative works on architecture which will always retain a high value, but which are hardly susceptible of republication; works consisting mainly of large and elaborate drawings which are the personal productions of their authors.

Among the smaller works which are more in the nature of illustrated treatises there are some which have kept their place and interest remarkably well, though they are perhaps rather works for general readers interested in the subject than for architects, and in connexion with Gothic architecture some of these have been the work of amateurs. Parker's Glossary and Bloxam's Gothic architecture are still excellent introductions to the study of English Gothic; much has been learned since they were produced, but they are well written and correct as far as they go. The Rev. J. L. Petit's "Architectural Studies in France," which now reappears,* is a book of the same class, by a man who was at once an able literary writer, a careful observer, and a really artistic sketcher, and possessed moreover a sufficient theoretic knowledge of construction. Petit had the merit, too, of having broad views in regard to the relations of architectural style, and was one of the first to perceive that the study of French Gothic was essential to the subject, and that Gothic could not be taken up as if it were an English style merely. His book would hardly be considered an architect's study-book nowadays, but it is a very good introduction to the subject for students and for general readers; and even from the architect's point of view, except for the almost entire absence of plans, which is a serious defect, it does not compare badly, for the time it was written, with Street's "Gothic Architecture in Spain," published eleven years later; and, except for the deficiency just alluded to, may be said on the whole to be as well illustrated.

The original preface to the work is of considerable interest, and shows Petit's breadth of observation and of principle in regard to architecture, and the degree in which he was in advance of many of the teachers of his own day. Our object, he says, is not to produce a building which might be mistaken by the antiquary for a specimen of a particular period or country, but one fitted in every respect, in reality as well as in appearance, for its purpose. "If in our attempts to attain this we make use of ancient examples, we must discriminate carefully between features which are simply characteristic of date or country, and true architectural principles:" a doctrine which is certainly not superfluous now. We have for the most part left off treating Gothic in this way, but only to adopt the same imitation of accidental features in much of the "free Classic" of the day, where we see the accidental combinations of features belonging to different dates and styles, in old buildings which have been altered at various periods, deliberately reproduced in new buildings, for the sake of piquant effect. Petit saw clearly too, what some people in the present day are losing sight of, that a great building may be produced with no other decoration than that afforded by strictly architectural detail, by which he means mouldings, as distinct from carved work. In his time it was the custom for writers on Gothic to speak of "dogtooth moulding," "beakhead moulding," &c.; he admits this slip himself, as a concession to habit, but repents of it, and claims that "moulding" should be restricted to its true and distinctive meaning, and observes that "it is on this class of ornament that the style must depend principally for its character; because a building may be very perfect, rich and beautiful, that employs no other."

It is still more to the credit of the author's insight and advanced stage of criticism at that period, that he strongly condemns that imitation Mediæval sculpture, the futility of which some people have not even yet found out. His testimony on this point, made so many years ago, is worth quoting:—

> "It may be said that some Mediæval statues have a grace and dignity that it would be difficult to find in later work. Most probably. Their sculptors worked in earnest, and undoubtedly attained a high degree of excellence. Still, I think I shall not be contradicted when I again assert, that no sculptor, anxious to advance his own reputation and his art, will ever set up a Mediæval statue as his model. He may acknowledge its merits, and learn much from a careful examination of it; but still he will not look up to its designer as his master and guide. When I say a Mediæval statue, I mean one fairly expressive of the character of modern Gothic statuary, such as would in the present day be considered suitable to a Gothic building. If this be so, I repeat that unless we can adapt our Gothic to the requirements of art, according to our highest acknowledged standard, in such manner that there shall appear to be no incongruity between the architecture and the sculpture, we ought to abandon it altogether, as a style calculated to repress rather than to encourage, advancement to perfection."

To come however to Petit's studies in France. These consist of remarks upon churches in France, taken during a tour the precise direction of which does not seem to have been guided by any previous plan, but in the course of which the writer described and in many cases illustrated by sketches, about three hundred churches. The notes are confined to churches; a fact significant of the period; in the present day châteaux would be regarded as at least of equal consequence. The first chapter contains some general critical remarks on French Gothic and its special characteristics. Some of the remarks in this chapter are worth a note. While ob-

* Architectural Studies in France, by the Rev. J. L. Petit, M.A., F.S.A. With illustrations from drawings by the author and P. Delamotte. New edition, revised by Edward Bell, M.A., F.S.A. London: G. Bell & Sons. 1890.

serving that in the earlier French work "the squareness of the general sections, and the monotony of the mouldings . . . . give an expression of severe dignity which cannot fail to produce its effect on the spectator,' the author remarks that the contrast between French and English work is even more marked in the small churches than in the cathedrals, and that a French architectural student would be as much struck, and would learn as much on visiting a group of English churches in Lincolnshire and Nothamptonshire, as an English one by a corresponding group of French churches. We fear French students of architecture seldom put this to the test. In pursuing the comparison, Petit observes very truly that "The former [the English parish churches] exhibit a depth, purity, and delicacy in mouldings, a studied elegance in the tracery of windows, a symmetry of outline and refinement in proportions, with a careful exclusion, from an early period, of every incongruous element, which are not so apparent in the French specimens." The author comments also on the poor appearance of the small and plain French churches of the flamboyant period, as compared with the very respectable architectural dignity of even the more unadorned English churches of the Perpendicular style.

As to the tour itself, it was apparently controlled not entirely by architectural considerations, though the author finds that had not his steps been drawn aside by other inducements he would have missed some of the monuments that interested him most. A remark in the general introductory chapter about the influence of rivers is worth note. The author records that he met with the best examples and in the greatest number on or near rivers, and when he traversed the dry tract of land to the north of the Loire, he found little to repay him; and in England he asks who has not in his rambles tracked the course of a stream from village to village, finding here a spire and there a manor house, &c. "Depend upon it, there is a great analogy between the pursuits of the fly-fisher, the artist, and the antiquary."

The greater portion of the sketches and notes have reference to the South of France, with a chapter added, later on, on "The Seine and Normandy." Loches and Beaulieu occupy the fourth chapter; Loches with its strange stone pyramids growing out of the back of the nave, like the humps of a camel, and its broad flat transverse arches strengthening the barrel vault internally. This chapter is extensively illustrated; it is rather strange to find the remarkable castle not even adverted to; but as before said, churches were the special object.

In a chapter on the geometry of vaulting the author takes rather a curious line of reasoning in regard to the formation of the diagonal ribs in Early Gothic vaulting. According to his view, the Early Gothic builders intended theoretically to use, and did in some cases (he does not give examples) actually use the mathematically correct elliptical curve for the diagonal rib, but soon discarded it for the use of adjusted curves which were more easy of execution, when once the idea of interpenetrating vaulting surfaces was abandoned for that of a structure of ribs with a filling between them. And he suggests that while the primary conception of the vault with an elliptical diagonal rib was theoretically correct, the departure from it involved no abandonment of a principle: "The false ellipse, made up of circles of different curvature, was soon substituted, and this substitution was actually an improvement." But this, he argues, does not alter his view of the case. "The imitation of the true curve proves that its propriety was recognised. Had the original designer of a cross vault with horizontal ridges made the diagonal rib a mere segment of a circle, he would have been guilty of a barbarism;" and he goes on to observe that one great excellence of exact design is that "it often provides for a wide licence as regards inexact workmanship." It appears to us that the contrary is the case, and that the maintenance of a mathematically true principle as regards the adjustment of parts of a design specially necessitates exactitude of workmanship. Certainly that is the way a Greek would have looked at it. As far as Gothic architecture is concerned, no sooner did the use of the pointed arch set the builders free from the necessity for endeavouring to accommodate circles of different radius to each other, than the idea of a scaffolding of vaulting ribs superseded the idea of interpenetrating surfaces, and then the design of the vault became a matter of convenience and effective appearance rather than of mathematical adjustment. The substitution of the stilted for the elliptic arch in the diagonal ribs, forming a kind of nook above the impost, gives, as Petit remarks, "amazing force and character to a Gothic vault." It does so, no doubt, at the cost of some confusion and difficulty in making a workmanlike junction of the ribs on or over the impost; but it is an entire throwing overboard of everything like theoretically correct design.

In the chapter on the domed churches of Perigueux the author observes that perhaps no building in existence shows the principle of composition and construction so undisguisedly as the cathedral of Perigueux, "a building which gives the idea of being thrown off as a rough and grand sketch, the filling of it up being left as a problem to future architects." He gives a view of the exterior of the domes as seen under the roof subsequently put over them. In regard to the broad arches supporting the base of the domes, he observes rightly that these are essentially portions of pointed barrel vaults, interrupted by the springing of the dome, and asks why they are at this early date pointed, when their exemplar, St. Mark's, carries out the problem with round arches. The Perigueux building is essentially Romanesque, not Gothic, yet the Gothic pointed form is adopted. Petit suggests that the intention of building the church with a genuine stone roof led to the adoption of the pointed vault for the interior, as working in better with the exterior form of the ridged roof, and this is probably the true explanation. He suggests also the idea that it was adopted in order to give greater strength for the support of the dome; but in such rude and naïve building as Perigueux cathedral really is, the simpler and more obvious motive seems the more probable one. Anything more ugly than the exterior domes of St. Front must have appeared in their original state has perhaps never been constructed in a building of this importance; they have the merit of constructive unity, but the builders had not mastered the problem of combining this with architectural beauty and fitness. In the interior it is otherwise, and it is interesting, as Petit says, to speculate what the interior design of St. Front might become if treated in a less rude and primitive manner. The piers, consisting on plan of four separate square masses, forming in elevation a group of four plain piers connected by semicircular arches near the top, leaving a high narrow open arch on each face, are rude enough in design; but, as the author observes, they are remarkably suggestive to the architect: "might they not, instead of being compressed into mere pilasters, be developed into grand masses, affording a marvellous breadth of effect, and capable of receiving the most varied enrichment?" Petit suggests that Wren actually did something like this in his famous model for St. Paul's, where we see "the arch compartment expanded into a wide cylindrical roof, and the pier compartment of sufficient width to exhibit a fine arched recess between columns crowned with a rich entablature." This, however, is hardly the way to bring out the inherent grandeur of the Perigueux design. It would not be a bad subject to set for a students' competition, to take the lines of the interior composition of St. Front and give them a decorative treatment in harmony with the spirit of the building. No doubt, as Petit says, "Perigueux could easily be put into revived Italian," but it is to be feared that its special impressiveness would be a good deal impaired under the process. On the other hand, asks the author, could St. Paul's [the design of the model] be put into Romanesque? "Can an interior, similar in its composition, in its distribution of light and shade, and in the grandeur of its architectural masses, be produced in a pure, consistent, and refined round arched style? If so, it is surely worth while to try and solve the problem." It certainly would be, and Petit is to be thanked for having left the suggestion, which at all events shows that, if not an architect, he had an eye for architectural possibilities.

The next chapter takes us through Touraine, with many illustrations either in the form of engravings or facsimile reproductions from the author's rapid sketches on the spot. These are very free and spirited in execution, as hasty sketches; they do not give an idea of Petit's powers as an artist, which were best exhibited in water-colour. The succeeding chapter deals with Poitiers, Vienne, Charente, Gironde and the Pyrenees. Charente has since then been magnificently illustrated in the beautiful volume got up by the Architectural Association as a memorial of their excursion into that district under the genial guidance of Edmund Sharpe. There is a chapter on "the barrel-roofed churches of central and Southern France," on "Roman work," on Normandy and the Seine, and on "Modern Style," not in regard to France especially, but in regard to the whole problem of the modern use of ancient styles. The architect of to-day will find that Petit's views on this subject were remarkably advanced for the date at which he wrote. He points out that the revivers of the Classical style in the Renaissance period never thought of confusing their work with that of the ancients, or of producing structures that might be mistaken for specimens of old Roman art. "They took what they wanted from the magazines of antiquity, moulded it into new combinations, and enriched it with new additions, so as to make it a real living style, suited to the exigencies of the day." This is perhaps a little too much to say for Palladio, but does apply to a good many of the Italian architects of the Renaissance. He wishes to look upon an Angevine church in the same light also, namely "as being capable of an aspect not suggesting the imitation of another age or people; as admitting of great refinement of decoration, as combining dignity, solemnity, and convenience, and as manifesting sound construction and durability." This is a suggestion capable of almost unlimited application. The whole chapter is well worth reading as a criticism on the position and the opportunities of modern architecture.

As a whole, the book affords a most agreeable and readable summary of the subject, not without interest to the architectural student of to-day, though written by an amateur of the last generation. Its chief value however is as a book for general readers who wish to have something more than a guide-book notion of the Early Mediæval architecture of France, by an observer who, without going into technicalities which would only be of interest to professed architects, and while writing from the point of view of an amateur, possessed sufficient special knowledge to be an intelligent and reliable guide. The book is one which should find a place in the libraries of all who are interested in architecture.

ROYAL INSTITUTION.—The lecture arrangements after Easter include the following:—Dr. E. F. Klein, three lectures on "Bacteria: their Nature and Functions" (the Tyndall Lectures); Professor Sylvanus P. Thompson, four lectures on "The Dynamo"; Mr. H. Graham Harris, three lectures on "The Artificial Production of Cold"; and Professor A. H. Church, three lectures on "The Scientific Study of Decorative Colour." The Friday evening meetings will be resumed on April 10, when a discourse will be given by Sir William Thomson, on "Electric and Magnetic Screening."

NOTES.

THE rumour as to the intention of some of the railway companies to emphasize their protests against the Board of Trade proposals by withdrawing some of their new Bills, was confirmed by the Chairman of the London and North Western at a special meeting of that Company on the 20th inst. Lord Stalbridge remarked that, looking at the effect of the Board of Trade schedules upon the revenue of the Company, the directors had considered it necessary to withdraw from their two principal Bills capital powers of 1,200,000*l.* and 600,000*l.* respectively, together with borrowing powers amounting to a further 600,000*l.*, and several minor Bills relating to widenings and extensions. We notice that the *Economist* considers this course ill-advised, but it has probably been taken with a view of influencing the decisions of the Joint Committee who are about to consider the Board of Trade proposals; and it remains to be seen whether the abandoned projects will not again make their appearance in another session. It is doubtless considered that a capital opportunity is afforded for a stronger and more practical protest than the mere prophecy of a diminution of income, and that the committee will be impressed with the idea that a great falling-off in profits is seriously anticipated. There is certainly a very wide difference between the proposals of the Board and those of the Companies; but, as there is an equally wide difference between the latter and their actual charges, there is not much fear that railway property is about to be depreciated, or that it is unsafe to embark any more capital in it.

IN the course of a recent answer in the House of Commons, with reference to the repairs of bridges by County Councils and the parochial authorities, Mr. Ritchie seemed to suggest that he had some legislation in regard to roads in view. We hope that such legislation is imminent. There should be one clear and complete Highway Act dealing with all matters connected with highways. Such an Act should also put the question of the widening of highways on a clearer footing. At present there is great disinclination by highway authorities to widen roads. This frequently prevents many places from progressing as they should do, and lowers the value of property. Wide roads are main elements in the comfort and convenience of localities, and in the long run cost less than narrow roads, which continually require to be repaired. What is needed is that a certain number of ratepayers should have the power to request the highway authority to widen a road, or part of a road, at the expense of the parish, and from the decision of the highway authority there should be an appeal to the County Council.

IN December last we gave a short sketch of the history of the so-called Berlin Cathedral question, and since then we have referred to the exhibition of models and drawings of the latest design for the cathedral worked out under the superintendence of Professor J. C. Raschdorff. That there is an increasing spirit of opposition to this design is obvious from the proceedings of the Parliamentary committee debating on the general Budget. In the financial year of 1889-1890 a vote of some 30,000*l.* had been granted for preparatory works for the proposed cathedral, and of this sum some 24,000*l.* still remain. It has now been proposed by the Government to extend this vote for the purpose of erecting a provisionary place of worship in place of the one to be pulled down (*i.e.*, the old "Dom") to make room for the proposed Cathedral; but this idea has been unanimously voted against, the committee not considering it advisable to vote money indirectly towards an object they are now opposed to, and do not believe can be carried out for the roughly-estimated sum of half-a-million sterling. The project now on exhibition (*i.e.*, the latest one) is estimated to cost about one and a half millions sterling, and even if the amount of sculpture shown in the design be reduced, or (as proposed) the whole cathedral, as is now proposed, be materially reduced in size, it is by no means certain that even then the sum of a half-a-million will be sufficient for the purpose. For the present, therefore, there seems to be a block in the cathedral question.

A RECENT number of the Ἑστία (22) announces that we are to have yet another School of Archæology founded at Athens. Spain is about to found an institute, which in general constitution will be after the model of the German one, hence we suppose it will be supported by Government. So far the Spaniards have done little for the promotion of the study of classical archæology,—no doubt owing to the lack of antiquities in the country. Madrid has long possessed a collection, including both marbles and vases of interest, but it is long since any substantial additions have been made. The Spanish school will make the sixth archæological institute founded at Athens, not counting the organisations of the Greeks themselves. It certainly seems a pity that some foreign nation should not select Asia Minor as its field, and Smyrna as its head-quarters. This was suggested at the time of the foundation of the British School. The members of a school settled at Smyrna would certainly have to forego many social delights, but they would be doing excellent missionary work in pushing out the outposts of archæology. Athens is really getting overcrowded with specialists, and already there is almost unseemly contention as to who should be first to pounce upon, elucidate, and still more publish each new discovery.

OATLANDS LODGE, Oatlands Park, is offered for sale by the late Sir William Drake's executors. In the finely-timbered grounds stands the famous grotto made at a cost of 40,000*l.* by Henry, ninth Earl of Lincoln, who by a special remainder in his favour, succeeded to the Dukedom of Newcastle-under-Lyme, at the death, in 1768, of his Countess's uncle, Thomas Holles. His son sold Oatlands to the Duke of York, who increased the estate by about 1,000 acres, including Brooklands and Byfleet. The house, —supposed to have been built by Henry, seventh Earl of Lincoln (died 1728),—was burnt in 1794, and rebuilt in an incongruous mixture of the Gothic and Castellated styles after designs attributed commonly to Holland. But in his "History of Surrey," Vol. II., 1841, E. W. Brayley says he owned several pencil sketches of it drawn by John Carter, whereon Carter describes the mansion as "erected under my own direction after the various styles of our ancient architecture." Lately converted and enlarged for purposes of an hotel, Oatlands is an historic property. By an indenture, dated Jan. 27, 1538, Henry VIII. takes it in exchange from the Rede family for the site and demesne lands of Tandridge Priory in the same county. As a royal palace it was visited by Queen Elizabeth, who used to shoot with a crossbow in the preserves, and was occupied by Anne of Denmark, for whom Inigo Jones built a park-gate, towards Walton-on-Thames, and, it is said, the "silkworm" room. The estate was made over for her life to Queen Henrietta Maria, and there her son, Henry of Oatlands, the Duke of Gloucester, was born. In Brayley's book is a woodcut, reproduced from Manning and Bray's "Surrey," giving a bird's-eye view of the Palace, with its many courts, *temp.* Elizabeth. Much of this was destroyed, and the grounds were disparked, during the Commonwealth. On his mother's death, Charles II. gave a lease to Henry Jermyn, Earl of St. Albans, whom she is supposed to have married. A subsequent grant to Sir Edward Herbert, Lord Chief Justice of the King's Bench, was transferred to his elder brother, Arthur, who demised the property (1716) to Henry, seventh Earl of Lincoln, as some say, having been meanwhile elevated, in 1689, as Earl of Torrington. In St. Mary's Church, Walton, were set up monuments to Lilly, the astrologer, who died at Hersham, in 1681*; Richard, Viscount Shannon (1740), by Roubiliac; and to his early patron, Mrs. Sarah D'Oyly, by Chantrey.

AT Berlin the "Akademie für Bauwesen," *i.e.*, an Academy interested in building matters, both pertaining to architecture and civil engineering, assembled in full force on the 16th inst. to consider what steps should be taken by them in regard to the school-education reforms, planned by the Emperor, to insure that youths, aspiring to the practice of architecture and engineering, should enter the Technical Colleges better prepared for the work in store for them than they are at present. The meeting appears to have been the scene of decided differences of opinion in regard to the matter of preliminary education, and, after a warm discussion, the majority were in favour of the more general educational programme, including classics, and against the students of the Colleges being recruited from the "modern" schools. The results of the meeting are to be embodied in a report, and to be published in the official *Centralblatt der Bauverwaltung*.

IN reference to the subject of Bridge Chapels, of which some illustrations were given in the *Builder* of November 22 and 29, 1890, it may here be mentioned, as supplementary to the information then given, that at Salisbury there is a chapel, now incorporated as a dwelling-house and divided into three stories, on the central pier of Harnham Bridge on the south side of the city. The pier being built on an islet of the Nadder there is more room for the chapel than is commonly the case with bridge chapels. The bridge was built by Bishop Bingham in 1244; and the chapel, which is dedicated to St. John the Baptist, is of this date. The east end still shows a triplet of lancets, and there are four more or less perfect on the north and south walls. Modern ceilings and partitions have destroyed nearly all appearance of antiquity within; almost the only relic is an Early English piscina in a fair state of preservation. At Lincoln also there was a chapel dedicated to St. Thomas of Canterbury on the "High Bridge" across the Witham. The earliest mention of it is in the reign of John, by whom the patronage was given to a Lincoln merchant before 1272. Elias, "the Parson" gave land in the High-street, adjacent to the bridge, for its maintenance. In 1304 the mayor and corporation founded a chantry in it. But so little care was taken of it by them that in 1324 Bishop Burghersh found it necessary to issue an injunction to the municipality to repair it. This seems to have been satisfactorily done, for a chantry founded at the neighbouring church of St. Benedict's by Thomas of Wigford and Agnes his wife in 1330 was transferred to this chapel. The foundation of another chantry was contemplated by George Heneage, then Archdeacon, and subsequently Dean of Lincoln in 1543, he giving 100*l.* and furnishing it with plate. But the times changed. Chantries, instead of being founded, were everywhere dissolved, and Heneage was glad to get his plate and 40*l.* of his money back again. The chapel was speedily desecrated, and in 1549 the bell was taken down and sold, and the corporation ordered that the sacred building should be converted into a dwelling-house. Early in Elizabeth's reign the chapel was granted to the Company of Tanners and Butchers as their common hall. It lingered on in ever-increasing desecration and decay until it was finally taken down about 1762. From a drawing taken by Buck, now, we believe, in the Bodleian Library, showing its eastern end, it appears to have been a building of much dignity, with a lofty gable containing a wheel window of six divisions, and a row of lancet windows below. It was strengthened by tall graduated buttresses at the corners.

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* "Hoc illi possuit Amoris Monumentum Elias Ashmole Armiger."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE tenth ordinary general meeting of this Institute for the present session took place on Monday last, at 9, Conduit-street, Mr. Alfred Waterhouse, R.A. (President), in the chair.

Examinations.

Mr. W. H. White (Secretary) announced that a Preliminary Examination to qualify for Probationers was held on March 3 and 4. There were 60 candidates admitted; 13 were exempted; 37 were examined in London, of whom 23 passed; 13 were examined in Manchester, of whom 6 passed; and 18 were relegated. An Intermediate Examination was also held on the same dates, when there were 13 Probationers admitted. Of these 11 passed, and 2 were relegated to their studies for a period.

An Examination in Architecture was further held during the month, when 63 candidates appeared, of whom 60 were admitted. Of these, 24 passed, 30 had been relegated to their studies for a period, and 6 had not passed. The following are the names of the passed candidates in the last-named Examination, which qualifies for candidature as Associate of the Institute:—

Begg, J., Edinburgh
Capper, S. H., Edinburgh
Clark, A. H., London
Cressall, W. T., London
Dods, R. S., Brisbane
Eves, W. L., Uxbridge
Fairhurst, H. S., Blackburn
Fleming, O., London
Fraser, W., London
Griggs, H. J., London
Hanson, E. C., London
Howgate, W. C., Ealing
Hutchings, J., London
Kitsell, T. R., Weston-super-Mare
Knight, J. A. G., London
Little, J. W., Clare, Suffolk
Mallet, H. E., Exeter
Mayston, A. R., Norwich
Meacher, A. J., London
Moore, A. H., Cricklewood
Prentice, A. N., London
Rawlinson, J., London
Sim, E. H., London
Twist, J. W., South Shields

The President added that they must be allowed to congratulate those who had the care of these examinations, and themselves, as Members of the Institute, on the satisfactory result of the examinations.

Some Aspects of Sculpture in Relation to Architecture.

Mr. George Simonds then read a paper on the above-named subject. The following is an abstract of the paper:—

The author considered that the subject demanded a general consideration of the arts as at present existing; of their past history and modern practice; and of the relation in which they stood to one another. A satisfactory definition of art was not easy, but it was not far wrong to say that art was embodied poetry and poetry disembodied art; their end was the same,—namely, the elevation of humanity and the idealisation of the present life and of every-day surroundings. Art under her present limited circumstances could do but little, and her influence for good was sadly restricted. Yet the time had been when art was loved and fostered for truer and better reasons than now,—not by the few alone, but by entire nations. While strongly maintaining the unity of art, its usual division into three branches had its advantages, although he greatly deprecated the tendency at the present time to ignore their close relationship. Painting was probably the oldest art, but that and sculpture had been merely pastimes for the gratification of a vague desire for beautiful form and colour, while architecture was the outcome of man's physical needs; and it must have been long before the last mentioned emerged from the purely utilitarian and took rank as a fine art. Without agriculture, architecture in its fullest sense could not have existed. In a primitive agricultural community architecture should flourish in an exact ratio to wealth, but in a trading community, choked with the commercial atmosphere of modern times, he could hardly see how there could be room for better art than prevailed at present. It was only when architecture ceased to count the cost, and was enabled to expend more than mere construction required, that she could take her true position, and enlist colour and form into her service; and what then was the relation in which the arts stood when thus combined? Architecture was the employer, and must be mistress of the situation. She needed nothing that her own resources could not give her, save ornament,—applied ornament. Sculpture in relation to architecture was to be considered as applied ornament, as a general rule; in the case of monuments, sculpture was the dominant idea, and architecture had merely to provide a worthy setting. The laws of ornament were largely founded on principles of judicious self-restraint. The most important was that the ornament should not interfere with the true functions of the object ornamented, nor conceal its purpose; it should not be disproportionate in value to the object, and no part of a building should be left unadorned that fairly admitted of decoration. Every blank space should not be utilised, but no space should be left blank unless there were a gain in so leaving it,—which was often the case. It would be hard to lay down a rule as to which parts of a building should be ornamented and which left plain, yet it might be assumed that carving was usually admissible where there was ample light, and where the situation afforded some degree of protection from injury, as in pediments and spandrels; and these positions should be occupied by choice work, not by mere masons' carvings. In wide spaces of blank wall, where sunk panels were used, sculpture might be turned to excellent account. Shafts of columns were not usually a good field for sculptural decoration, and very elaborate bases and capitals were seldom quite satisfactory. Caryatides used as independent supports seemed even more objectionable, although used as applied ornament the effect might be extremely fine. The proper amount of relief to be given to work in any position, and the amount of realism admissible, were points of first importance and of great difficulty. The relief in the powerful group of "Hercules and the Horses" in the pediment of the Royal Mews, Buckingham Palace-road, was exactly suited to the position, which was not the case in the pediment of the public baths a few hundred yards away, in which the post of honour intended for St. George was usurped by the belly of his horse. Much had been written and said to prove that marble sculpture was out of place on a stone building, but the effect of time on stone and marble formed a harmonious whole out of what seemed at first mere incongruous patchwork; and the effect of time deserved consideration. Liverpool afforded examples of that in the marble statues on the Town Hall, and the bas-reliefs of the St. George's Hall. Mr. Simonds referred in considerable detail to various kinds of marble for sculptural purposes, and described their good qualities and defects, mentioning the quarries from which they were procured. Although common sense condemned the practice, sculptured floors were not unknown, notably the flooring of the Palace at Koyunjik, built by Sardanapalus III. about 700 B.C., and known to most from the Assyrian collection at the British Museum. It was a pity so lovely a design should ever have been trodden under foot; and he considered a floor to be one position where no sculpture should ever be. The ceiling, on the other hand, offered a clear field for sculpture, and he was glad to notice that within the last few years considerable attention had been given to it. The first object of a ceiling was to cover the room, secondly to diffuse and reflect the light, and it should be kept clearly defined and be light in colour. There could be no worse decoration for a ceiling than pictures. From what information the author had gathered of Indian sculptural decoration it seemed to be so far removed from that of the West that it could scarcely be hoped to deduce from it much that would be of service in England. From the representations of the ruins in Yucatan, sculptural decoration in Central America seemed to have been treated in a manner which could not but be appreciated and approved. The temples appeared to have been placed on the summits of vast pyramids; they were rectangular in plan; and the front wall was pierced with five doorways, having wide and massive piers between each. These piers were each adorned with a colossal figure in relief, the effect being almost Classic in its grandeur and simplicity, while the sculptural decoration had been applied with great skill and judgment. Having referred to the Egyptian and Assyrian sculptures, the author considered the only building in England which showed affinity to the Egyptian and Assyrian temples as a historical record was Westminster Abbey, and he strongly deprecated any removal of its sculptured monuments. Much of the sculpture in England in connexion with architecture was Gothic, and he could not understand why it was always so grotesque and unnatural. The old English sculptor carved his charmingly quaint kings and saints in simple faith, making them as good and natural as his art would permit; now they were carved as the sculptor knew they never were, and the result was a self-conscious caricature of the naïve, unconscious work of the older artist. The modern work gave the author no pleasure, although he greatly admired some of the genuine old statues, but thought a series of figures all round an arch was out of place. In almost every school and age instances could be found of misapplied sculpture, excepting, perhaps, the Moorish. The bronze horses half way up the façade of St. Mark's, Venice, was an example, while one of the finest examples of how to treat sculpture in connexion with architecture at Venice was in the Campo SS. Giovanni e Paolo,—namely, the statue of Bartolomeo Coleone. The Florentine artists of the Renaissance were not often to be found in fault, unless it were that occasionally the leading part seemed to be assumed by sculpture when architecture might be expected to be predominant. Having described several examples of Florentine work, Mr. Simonds referred to the Romans, who had, he considered, used sculpture with more restraint and more consideration for architecture than either the Venetians or the Florentines; perhaps architecture and sculpture harmoniously working together was best exhibited in the Church of Sta. Maria del Popolo, in the Sforza and Basso Tombs, both by Sansovino. Although the finger of scorn had been pointed at the Albert Memorial, it was, in his opinion, a work of which the nation might fairly be proud. It was a first attempt, and a most creditable one, to realise the proper relationship between the three branches of art. There were many maxims beginning with "don't" to be observed, such as "Don't turn a hero's monument into a temple of Cloacine"; "Don't leave your triumphal arches and gateways unadorned with sculpture"; and, if there happened to be an arch crowned with an indifferent statue, don't take it down unless to replace it by something better. Alluding to Hyde Park Corner, the author drew attention to the want of relationship between the architecture and the sculpture, and considered, referring to the copy of part of the Panathenaic frieze on the gateway to Hyde Park, there was no greater sign of poverty in a nation's art than to put up with copies from elsewhere. He could well imagine with what admirable effect sculptural decoration might be used in domestic architecture, but the cost of the first outlay, the restlessness of the age, and the system of building on leasehold land, rendered it unlikely for sculpture to take a serious part in adorning domestic architecture. Four things were needed: a freehold for the site, a liberal employer—liberal of mind as well as of hand—a cultivated architect, and last, a sympathetic sculptor. Whenever and wherever these came together, there could be no difficulty in solving the problem of the true relations of sculpture and architecture.

Mr. H. H. Statham, at the close of the paper, proposed a vote of thanks to Mr. Simonds, and offered a few remarks which the paper had suggested. In the first place, as to the general principle touched upon at the outset, that there was only one art, and that they were bound always to consider that, it was, of course, entirely true in one sense, viz., that the artistic spirit was equally to be displayed in painting, sculpture, or architecture. There was great gain in certain directions from their being used in association with each other. But there was another point, which was a little forgotten in the present day, viz., that painting and sculpture, when they were to be used in connexion with architecture, had both to give up something, and he had often been surprised that sculptors did not seem to see that. And he wished to urge also that architecture was not after all dependent, even for her higher effects, upon a combination of sculpture and painting. In the case of the Pantheon, that grand conception of the great dome with the large eye in the centre,—any one who went there did not think of the sculpture and painting, but of the architectural conception. Of course, architecture was not merely the appearance of the building, but the conception based on the plan. He fully agreed with Mr. Simonds, that another glory was added in the case of sculpture, but, at the same time, he wished to maintain that architecture could stand alone. Turning to the consideration of sculpture, it

must be remembered that when it was desired to make sculpture part of the architectural whole, it was necessary to treat it with a certain reserve. The sculpture, for instance, in the front of Wells Cathedral harmonised admirably with the whole, but was more or less conventional, the only part where there was any vitality being in the half-life-sized figures of the Resurrection series. If the whole of the sculpture on the front had been treated in the same way, the repose of the architecture would have been destroyed. There was a significant anecdote told about Thorwaldsen, when he was asked to make a set of statues of the Apostles for niches. He said he would have no sculpture in niches, but, being pressed to consent to it, he asked for the exact height of the niches, and then took care to make all the statues just 2 in. too high to go in. That showed how strong his idea was that his sculpture should stand alone. Of course, sculpture was assisted very much by having an architectural background. At the same time, if a piece of sculpture was strong in vitality and expression, it should stand alone by itself, and not as a part of a building. One question had not been touched upon, viz., that of the subjects of the sculpture which was to decorate modern buildings. Were they to go in for Classical subjects, or attempt what the Greeks did, and represent their own life? That was a question which had not yet been fairly answered, but if an attempt were made to represent everyday life on the buildings of the present day, it would probably, in many cases, cause as much amusement as it did enjoyment. He believed that the French had solved the problem of monumental sculpture well, and he might instance the beautiful monument to Regnault, where there was no attempt to go into the difficulties of portraying the man himself, but to erect an architectural design, with a bust portrait forming part of it, thus giving the intellectual presentation of the man, and making it a part of the architectural design, There were one or two separate points he would like to refer to. With regard to very richly ornamented capitals, he thought the objection was only when the ornament was in too high relief, and one felt that in a smoky town it could not last, but he did not think that richness of ornament was any objection in itself, as long as it was kept in low relief. There was a great beauty about low relief work, and it was a curious question why the Greeks put high relief metopes on the upper portion of their buildings, and, at the same time, put a very low relief frieze at nearly the same height in the same building. He should be inclined to think that the Parthenon frieze should have been down below, and near the eye. With regard to St. George's Hall, and the combination of marble and stone there, he considered the introduction of the marble rather an unhappy thing, and quite contrary to the intention of the architect, who had left a set of projecting stone blocks which were eventually to be carved in sculpture. He believed the architectural result would have been better if the sculpture had been carved in stone, instead of letting in marble, which took away the architectural unity of the building. He was glad to hear what had been said about the decoration of ceilings with pictures. It was the worst thing that could be done with a picture to put it on the ceiling. As to Westminster Abbey, surely they were not to be asked to accept that as a parallel with Greek and Egyptian sculptures which were in the same style as, and in harmony with, the buildings with which they were associated. He fully agreed, at the same time, with Mr. Simonds in his opinion, that he would not allow the monuments to be touched, but not for any artistic reason; in fact, if it were simply an artistic question, he would bundle most of them out of the building. He objected to their being touched because when people put up the monuments they had a right to expect that they should not be tampered with. He would express his hearty sympathy with the remarks Mr. Simonds had made about the modern mock-Mediæval sculpture, which was only done because it was a fashion of the day. With regard to the Wellington Statue, Mr. Simonds apparently thought that the new statue should have gone on to the top of the arch. Now, there he most strongly dissented from the lecturer for this reason, that the architectural design of the arch required a finial facing to the front of the arch, whereas the equestrian statue could only be placed sideways on it. The *quadriga* intended by Burton formed a sculptural group, fronting the same way as the arch. A *quadriga* had not very much meaning for us now, perhaps, but as a matter of composition it was much more suited to the position. He begged, again, to move a vote of thanks to Mr. Simonds for his paper.

Professor Kerr seconded the vote of thanks.

The President, in putting the vote of thanks, said that Mr. Statham had so thoroughly traversed the paper that there was very little more to say on the subject. He would only call attention to the fact that Mr. Simonds thought the architect was the employer and master of the situation, and that seemed to go into the whole question of the employment of sculpture on architecture. It was, perhaps, the reverse. Architects felt that sculptors had a reputation as artists, and that any attempt to dictate to them would be out of place. The consequence was that sculptors were left, when employed on architectural work, very much to their own devices. However excellent their works might be, there was, therefore, a want of sympathy between them and the architecture which surrounded them. The consequence was that the alliance was felt to have been more or less a failure. He believed that Mr. Simonds had struck the true chord. He had impressed upon them the importance of an absolute sympathy between the architect and sculptor. The architect must, of course, come first, and must design the building, before the sculptor entered on the field of his labours, and all that was required was a more thorough accord and sympathy between the two artists. With regard to Mr. Statham's remarks about the metopes of the Parthenon, it had always seemed to him that those metopes were made in high relief, because they were placed immediately under a projecting cornice, which threw a very strong shadow.

The vote of thanks was then put and carried by acclamation.

Mr. Simonds, in reply, said that the differences between himself and Mr. Statham were probably more apparent than real. With regard to his remarks about sculpture having to suffer when placed in immediate connexion with architecture, he could not see that there was an evidence of that in the sculpture of the friezes from the Mausoleum at Halicarnassus. He could not imagine anything freer or more truly sculpturesque than these with regard to the metopes; his objection was not to works in high relief, but to the employment of a high relief when the works were placed high and had to be seen from below. He agreed with what the President had said as to the effect of the projecting shadow being thrown over them. Much of the sculpture in Westminster Abbey was abnormal and hideous. At the same time, it was a grand historical record, and it was impossible to detach sentiment from Art.

Mosaics.

Mr. Arthur T. Bolton next read a paper on "Mosaics." Mr. Bolton said he had written his short notes to be read in connexion with some drawings exhibited on the screen. It appeared that writers divided mosaics into four classes, such as (1) *Opus Tesselatum*, in which the cubes were $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. square, the designs being geometrical; (2) *Opus Sectile*, composed of cut portions of marble or glass enamels fitted closely in elaborate designs; (3) *Opus Fictile*, or mosaic in cubes of glass; and, lastly, *Opus Vermiculatum*, in which pictures or imitations of natural objects were copied by very small cubes, the joints forming no part of the design. This last class was also divided into two, *Opus major* and *minor*, the former being executed in a coarser style. It was to the class of *Opus Tesselatum* that the drawings mainly belonged. Such work was also termed "*Lithostratum*," the word "*musivum*," from which "mosaic" was derived, being originally reserved for the elaborate works classed above as *Opus Vermiculatum*, and also for works in enamel and glass mosaic. The origin of these pavements had been ascribed to stucco floors painted in patterns, but this did not appear to be a very scientific deduction. Perhaps they originated in simple *pisé* floors of brick or marble fragments, afterwards lined out by cubes of white marble into simple patterns, and some floors of this rudimentary kind might be seen at Pompeii. The rather tame effect of the white on the pink-red would be followed by the use of reds and yellows in coloured patterns, and the progress of the art would lead to the imitation of pictures, which was carried to so great an extent in later work; but this class was beyond the province of pavements. Mosaic was, of course, executed in any hard materials, durability and colour being the chief things attended to. The examples on the screen were nearly all in white and black marbles. Belgian for black, and Carrara for white, would be used for modern work, as in an example shown of a chancel pavement at Folkestone. As to the execution of the examples, the first thing that would be noticed was the variety in the sizes of the cubes used, and in their spacing. The examples of patterns for the Baths of Caracalla might be compared with that from the House of the Poet at Pompeii, which was the smallest style of work in the set. The Caracalla cubes were as much as an inch square. The centre ornament in the pattern for the House of the Poet was an extremely old form, and might be seen on an Assyrian bronze dish in the British Museum, it being formed by intersecting circles. The mosaic of the Wild Boar was, of course, well-known, and it was curious to compare it with a Romano-British example, where the white ribs were omitted as their importance and value were made evident. With regard to the Venetian examples, the scroll in a larger key than the Pompeian was interesting, especially for the characteristic use of some red to heighten the effect. Two classes of common errors to avoid in executing mosaic pavements might be mentioned. First, filling, or the use of smaller pieces than the cubes employed for the general design—in patches, say, to fill up a curve—was very bad. It was like the use of a half-tone, and tended to make the pattern unduly detach itself from the ground, which was a great defect. Secondly, fitting, or the cutting of cubes to circles—as for eyes—or to wedge shapes for curves, &c., was very injudicious; it tended to destroy the conventional and free character of the work. Modern mosaics were apt to fail by such points being overlooked, and he was glad when a publisher undertook to produce his drawings as a book, reducing them only one-half their size, and giving, in addition, three plates of selected pieces full size, showing, for the first time, in a handy form, the true methods of old mosaic pavements.

Professor Kerr proposed a vote of thanks to the lecturer, and in so doing, desired to make a few remarks on the general question, for to his mind the subjects of the two papers were practically one. If there was one thing more than another in which he thought English architects had, for many generations past, been deficient it was in the use of applied ornament. They had that evening had an explanation of the principles of almost all kinds of ornament which the architect had to use. There was the ornament in flat, such as was appropriate for the mosaics; the ornament which was termed ornament in mere relief; of which Mr. Simonds spoke; the ornament called carving, and which might be said to be different in some particulars from what was termed mere ornament in relief; while, lastly, there was the use of sculpture, which had been so singularly neglected in this country. The use of sculpture, as an ancillary art to architecture, was what Mr. Simonds, to a great extent, suggested with some enthusiasm. The President had made a very proper remark to the effect that an architect scarcely liked to dictate to a sculptor of equal or greater eminence than himself; and it seemed to him that was a point of very great importance. A little time ago, a discussion took place in the French Chamber of Deputies with regard to art questions in relation to a certain monument. The architect, so far as he understood, was considered to be master of the situation, and it was found that the sculptor and painter rebelled, and there was very great difficulty in the architect keeping them in harness. If, then, the French, with their peculiar qualifications, could not get a sculptor and painter to run in harness, how much more difficulty would the English architect, with his peculiarities, find in getting these men to act in a subsidiary capacity to himself? A good many years ago a discussion took place in that room on that particular question, when the late Mr. John Bell, a very distinguished sculptor, was present. He (the speaker) ventured then to mention that a sculptor of considerable eminence in Edinburgh had told him that a life-sized figure, of a similar character to those which adorned Sir James Pennethorne's build-

ing in Burlington-gardens, for the University of London, could be produced for 100*l.*, and he asked Mr. Bell if he would give a little information of a practical kind with reference to that statement. Mr. Bell's answer, however, was that when he was asked to produce such and such a statue for Westminster Hall, he got 1,000 guineas for it. But that information was of no use to architects, and that was all they could get. It seemed to him, therefore, that the English sculptor, if he was to get the advantage of working on buildings, must put himself on a level with the ordinary French and Scottish sculptor as represented by the one he had mentioned. The sculptor must consent to do his work—he would not say "on the cheap," and still less would he say in an inferior manner,—but in such a way as to come within the limits of the resources of Englishmen. Sculpture of a high order had been too expensive. They could get carving done at a moderate expense, but there was no reason in the world why they, like the French and Germans, should not be able to overlay their buildings with sculpture,—he did not say of the highest class, but of a style equal to that with which they were familiar in the French and German work,—at such an expense as Englishmen would consent to pay. In connexion with that, he would like to remark upon the doctrine which had been hinted at that evening of the unity of art,—a doctrine which was coming very much to the front, and which would serve, in the course of the next generation or two, not only to consolidate the arts at large in their influence on the English mind, but to encourage artists to regard all arts as of equal value, and having for their object the improvement of the public mind, not simply for the gratification of the *dilettanti*, but for the enjoyment of the world at large. That he considered to be the view which the public of this country were beginning to take of art at large, and that was what was meant by the unity of art. The old formula of the three arts—the sacred trio of Painting, Sculpture, and Architecture, had gone by. There were many other arts besides these three, and he ventured to claim an equal value for them because of their equal merit as agents for the enjoyment of the people at large. The Albert Memorial had been referred to as an illustration in point, and an excellent instance, no doubt, it was. The sculpture which was produced there was of a very high order, and of a much higher order than architects could expect to make use of in connexion with ordinary buildings. He was extremely sorry to hear the criticism of Mr. Simonds on the statuary produced in this country. The remarks made by Mr. Simonds on the point he considered quite undeserved. No doubt much of our sculpture was bad—there was a certain average, beneath which all was to be more or less animadverted upon, and above which all was to be commended; but it was a pity that a sculptor should join in the idle cry of newspaper penny-a-liners in condemning all sculpture indiscriminately. A great deal of modern sculpture was of exceedingly high merit, and much which had been produced in the present day in the form of public statues was well worthy of the highest aspirations of English sculptors.

Mr. J. M. Brydon seconded the vote of thanks to Mr. Bolton, and was sorry that his paper had been so short. The principal difficulty of architects in connexion with public buildings was that they did not get the opportunity of employing sculpture, because they had not the money. He hoped the day, however, was not far distant when a better state of things would prevail, and notably in the case of the proposed new building at South Kensington, which, he hoped, would be a representation of the union of the arts in painting, sculpture, and architecture.

The motion was then put, and very heartily received.

Mr. Simonds said he wished to remark that he must have very badly expressed himself if he was supposed to have fallen foul of the British sculptors. What he had fallen foul of was their employers. The fault did not lay with the architects and the sculptors: the fault lay with the employers. Although he said it himself he considered the sculptors of England were a wonderful body of men, and there was no other country so situated as this, where they had a school of sculpture such as we had in England. There were a number of men who practically kept British sculpture going at their own expense, while in all other countries the art was subsidised by the Governments. In England, on the contrary, it was kept alive solely by the self-denial of a small band of enthusiasts; and it was not from any lack of goodwill or talent that sculptors had not done better. With regard to the question that Professor Kerr had asked as to the price of a statue, it was like asking what would be the price of a life-sized portrait by an English portrait painter. The price would vary according to circumstances, and the cost of the statue would depend on whether it was done by a carver under the guidance of the sculptor, or whether he did it all himself. He had no doubt that many men in London would make a small-sized model, from which a full life-sized statue would be pointed, for 100*l*, but such a man would not make a life-sized model and execute the statue himself for so small a sum. On the other hand, they would get a much better statue for 500*l.* or 600*l.*, although the public would not be able to tell the difference.

The President then announced that at the next meeting of the Institute, on April 6th, Mr. William Simpson would read a paper on the "Mutation in Indian and Eastern Architecture."

The proceedings then terminated.

SPANISH ARCHITECTURE.*

SPAIN is a country fascinating chiefly through its unlikeness to any of the other parts of Europe. It is with a sensation almost approaching awe that one passes through bleak treeless plains unbroken by any homesteads, except at long intervals the glint of a few white low walls amid the prevailing brown, and perhaps, rising above the horizon, the toothed and dinted edge of one of the Sierras, justly so named.

Though there are other scenes than these, the emerald vineyards, with gorgeous pomegranates between, the fertile fields of the Vega, and the wooded valleys in the north, the foreigner will, nevertheless, carry away as his impression of Spain that of a treeless, rocky expanse, not without a certain grandeur of its own, but in spite of the brilliant sunlight, presenting a somewhat cheerless front to the wayfarer. Not so the cities, for, as with other southern races, the vivacity and *bonhomie* of the people give their town life a cheerfulness and interest, the novelty of which is very grateful to the Englishman.

Consequently, though in France or Italy one may like to stray from the beaten track in search of the simpler but frequently more picturesque architecture to be found amid rural surroundings, you will find in Spain less inducement to do so,—the vast area of the country, and the distance apart of the principal towns, rendering the difficulties greater.

While far from suggesting that there are not many places in Spain that have not been adequately studied, I should say that the best course for the student would be to proceed from town to town, — except, perhaps, in Andalusia, where, time permitting, a ramble up one of the mountain valleys would prove an attractive excursion.

However, as far as work is concerned, almost entirely in the cities does one find that vigorous architectural effort which in France and England is also visible in country mansions and churches. The rural work is chiefly confined to defensive castles with but few pretensions beyond their utilitarian purpose. Architecture in Spain may be broadly divided into four groups, namely, the Roman, the Gothic, the Moorish, and the Renaissance. The remains of the first-named are both extensive and widely distributed, but as might be expected do not compete with those of Italy in variety and elegance of detail.

As regards the Gothic work, my studies were not of a sufficiently comprehensive character to enable me to add anything to Street's standard work on the subject. The Gothic work, with some notable exceptions, lies mostly towards the northern part of the peninsula, being contemporary with the Moorish work in the south.

Having thus briefly dismissed these two groups, I come to the third, comprising that work which is usually termed Moorish; it should, however, be subdivided under three heads. The first subdivision, which I should term Arabic, was, of course, greatly under the influence of the Byzantine style (the one prevailing in the civilised world when the Arabs first came in contact with it). This Arabic style lasted from the seventh till the eleventh century. The second subdivision is the true Moorish style, and its development dates from the ascendency of the Moors. The third is usually termed Mudejar, and comprises the performances of the Moorish workmen under the direction of the Spaniards after the Christian re-conquest. Though the terms are not fully expressive, I shall refer to these three developments as Arab, Moorish, and Mudejar respectively. The principal monument of the first is the great mosque at Cordoba, from which, though it has suffered considerably by subsequent alterations, a great deal of information may be gleaned. In the earliest portion, the date of which is 786 to 796 will be found but little, if any, original ornament, the capitals of the columns being all Roman, taken, most probably, from the neighbouring Italica. The second portion (date 961-67) includes the magnificent Mirhab with its mosaic and carving, evidently both in colour and form under the influence of the Byzantine style, and said to have been partly executed by workmen from the East (I might note that most of the mosaic work is an unworthy restoration). The third portion of the mosque was added by Al Manssour in 988-1001, and to it belongs the doorway shown in one of the sketches on the screen.

You will see that the work still retains some of its Oriental character, and differs entirely from the Moresque of the Alhambra and Alcazar. I may mention, in passing, that, apart from the loss of its elaborate ceiling, more recent restorations have inflicted the most serious injuries on the building from an artist's point of view. The much-abused choir of the sixteenth century is, to my mind, by no means an unmixed evil. The mosque, with its repetition of form, has a somewhat monotonous character, and almost the only play of light and shade it possesses is due to this lofty lantern rudely thrust into the midst of its avenues.

The work of the Arab period will be found to be far from possessing the marvellous facility of *technique* which was afterwards attained, a fatal facility, in that it led to the repetition of form which renders the Moorish work somewhat unpleasing to the European mind.

Passing on to the next sub-division, best typified in buildings of the Alhambra and the Alcazar, one might note that in the former building but little remains of the original coloring of the plaster work; in the latter, none at all. Considering the elaborate way in which this work has been described and illustrated, I will only venture the remark that in the various drawings and restorations I have seen the colours appear to me to have been kept in much too bright a key, the blue particularly being too light. I believe the general tone to have been much fuller and deeper, such as that of an Oriental carpet or a Byzantine mosaic,—the schemes in both of which I imagine to have been developed from some common origin in the early Aryan races of Western Asia.

As regards the Mudejar work, though not without interest, it will not by most of us be considered worthy of extended study. To this style may be said to belong the numerous artezonado ceilings, of which the one I have here is an example.

I should think that the work in Sicily, executed under like conditions, possesses many points in common with it.

This Mudejar style was practised in the southern part of Spain, down to the time of the final expulsion of the Moors in the sixteenth century, and though some work of a Gothic character was executed, it was too late in its transplantation to reach any thoroughly organic form. In many cases pointed design is incongruously combined with Moresque detail, from which it had not completely freed itself before being swept away by the Renaissance.

In Granada, of course, hardly any work that can strictly be called Gothic exists. The date of its capture, 1492, being but a few years prior to the general introduction of the Renaissance.

Nevertheless, you will, I think, come to the conclusion that the Spaniards, a Gothic race, were imbued with a true feeling for the style that by rights belonged to them. In witness of this, note their affectionate retention of the Gothic mode of architectural expression far on into the sixteenth century; in some cases, as at Segovia, almost completely Gothic; in others, as at Granada and Baeza, retaining

* From a paper by Mr. H. V. Lanchester, read before the Architectural Association on the 20th inst., as elsewhere mentioned.

the plan and general proportion, while using Classic detail. Though this was not carried to the extent general in France, the Spaniards seem to have been far from displaying the readiness of the Italians to revert to the ancient forms.

We thus find that the Spanish Renaissance was developed under two strong influences, that of the Moresque, chiefly evident in Toledo and the South, though with some admixture of the national Gothic feeling; while in the north the latter influence (as might be imagined) predominates.

The characteristics which the Spanish Renaissance drew from the Moorish work are those that give it its individuality; remove them, and it could (I believe) hardly have laid claim to being considered as more than a branch of the French, at all events a style much allied to it.

The Moorish influence consequently remains the most interesting study in tracing the development of the work of the Spaniard. To this it owes in great measure the minuteness and delicacy of finish which has earned for it the misnomer of "plateresque," to this again the richness and intricacy of detail full of playful and exquisite fancy. And, again, that valuable effect obtained by the contrast of features of great and piquant interest, with large, simple, sunlit wall surfaces But not all was gain. The Moor, who never tired of covering his erections with exquisite patterns, had quite different ideas on the functions of ornament to the European, and was consequently but a poor guide as regards structural expression or scale. One finds in a large proportion of the sixteenth century work a want of skill in dealing with ornament that, despite the, and sometimes indeed because of the minuteness of parts, leaves an impression of coarseness in the whole, an impression one rarely receives from Italian or French work of this date.

I feel confident that you would find the study of this earlier Spanish Renaissance a most interesting one, as apart from its intrinsic value. I think I shall be able to show you that it had no small share in the formation of the English Renaissance style of the sixteenth and seventeenth centuries. Curiously enough, while the part that France and the Netherlands played in forming this style of ours is admitted, the influence coming through Spain seems to have been in great measure overlooked. Without disregarding the fact that much of this influence probably reached us by way of the Netherlands, during the Spanish ascendancy there, I yet think that a large proportion of it was direct.

Turning to history, we find under the later Tudor sovereigns ample instance of intercommunication between Spain and England; in fact, Spain took at that time by far the most prominent part in our external politics—sometimes in peace, as during the two royal marriages and contemplated third, at others in war, but the whole time, in all probability, carrying on an active interchange of ideas, either by means of commerce or political missions, or at times by the prisoners of war.

What, during this time, were the external inducements toward intercourse with Italy? They were but slight. In individual cases, such, for instance, as Burleigh, direct influence from the fountain head must be admitted; but I should consider that, prior to Inigo Jones, few of the English builders derived their inspiration from Italy. France, from her proximity, must have had a share in forming the English Renaissance; but I believe that in the work, obviously suggested from abroad, the Spanish character will be the one most frequently predominant.

Let us appeal to a few examples. Now, the earliest which I can call to mind is in the Perpendicular period, and is exactly where, if anywhere, one would have expected to find it, namely, in the town that was formerly the great port of the west—Bristol. You will know that I refer to the doorway in the north porch of St. Mary Redcliffe (there is a doorway of similar outline to the Church of Iron Acton, but it is probably a mere imitation of the other). With this exception the doorway is unique, and quite unlike anything else in the country. Its curious reversed curves, which cannot be called cusps, are anything but structural forms in themselves, and could only have been derived from the interlaced tracery common in Spain and some parts of Germany. Its character and treatment speaks, if my memory serves me, distinctly in favour of the former source.

Passing on to the Renaissance, I will point out by the aid of these photos and sketches the points where there appears to be a parallelism in the arrangement of detail between the Spanish and English work. Take the general grouping. Both often favoured an elaborated and raised centre feature contrasted with simple, broadly-treated wings, as at Bramshill. At Kirby is a not very successful effort at a centre feature of the type I mean.

There you will find pierced parapets as at Layer Marney, and finials at intervals treated in a remarkably similar manner. Then, as to doorways: I have noted those of Wroxton Abbey, Oxford; Montacute; Waterstone, Dorset, which you would find it interesting to compare. The later one at St. Mary's, Oxford, is perhaps the most striking instance I have come across; one would hardly have been surprised had one found it in a Spanish town.

I would draw your attention to the ceiling of Boughton Malherbe, as illustrated in Nash. I might multiply instances of numerous other features, as staircases, &c., but there is little need to do so.

Mr. H. O. Cresswell said he had very much pleasure in proposing a vote of thanks to Mr. Lanchester for his interesting and suggestive paper. He (the speaker) regretted that he had not himself been in Spain, and, therefore, he should not like to pronounce upon the theory which Mr. Lanchester had broached, that the English Renaissance architecture was derived to some extent from Spanish architecture. Mr. Gotch's new work on the English Renaissance was very opportunely now in course of publication, and although the first part of it only dealt with the earlier phases of the Renaissance, he thought it would be suggestive to take some of the plates which had already appeared, and which would appear, and compare them with the illustrations which they had before them of Spanish architecture.

Mr. S. B. Beale said he had very great pleasure in seconding the motion. He, also, regretted that he had not been to Spain; but Mr. Lanchester's paper, with the many beautiful illustrations which accompanied it, almost made him feel as though he had been there. One peculiarity about Spain was, that in whatever direction their taste might lie in architecture, it contained a great deal which they could all admire. That was a *trait* which hardly belonged to other countries; and he therefore hoped that the Committee of the Association would endeavour to arrange for an excursion to Spain, which, it appeared to him, offered a very great field for sketching. Whatever their individual tastes might be, they would all be able to find something for their pencils. He should have liked to hear from Mr. Lanchester a little more about the decoration of interior wall surfaces. Was there much of that to be found? He thought that Mr. Lanchester had in a very interesting manner endeavoured to draw some parallels between English and Spanish architecture; but, nevertheless, he did not think he was right in his deductions.

Mr. Garbutt, in supporting the motion, said he thought Mr. Lanchester's paper was a very interesting one, and he thought that there was something in the suggestions that he had made as to the derivation of some features of English Renaissance architecture from a Spanish source. There was one peculiar feature about Elizabethan work, viz., the long pinnacles which were to be found stuck up in Elizabethan buildings. They did not seem to have been derived from the Gothic; but they were very similar indeed to features of the same kind which were shown in the drawings of Spanish detail exhibited by Mr. Lanchester.

The President, in putting the motion, said that there could not be two opinions as to the interesting paper which had been read to them by Mr. Lanchester. Mr. Lanchester was also additionally entitled to their thanks, inasmuch as he had at the last moment stepped into the breach caused by the inability of Mr. Prior to read the paper which was arranged for in the syllabus of meetings. As he (the President) had not been to Spain, and had not seen the detail which Mr. Lanchester conceived might have given the idea for some features in English Renaissance detail, he would not venture to pronounce upon the tenability of Mr. Lanchester's theory.

The motion was then carried.

Mr. Lanchester, in the course of his reply, said that with regard to internal decoration there was very little of it to be seen in most Spanish buildings, as it had been covered up by coats of glaring whitewash. In architectural sculpture, however, the Spaniards had done some very clever work. Much of it was still to be seen.

Mr. Horace Townsend then read a paper on "The House that Jonathan Builds," which we hope to give next week.

UNIVERSITY COLLEGE LECTURES.

ON Thursday, the 5th inst., Mr. Cecil H. Smith (who, along with Mr. St. Chad Boscawen, takes part with Professor Poole in the present course on Archæology) gave the first of his four lectures on Greek Vases and Pottery in the first Greek room of the British Museum. He said that while the Greeks used pottery for ordinary purposes, they placed vases in their temples and tombs. The painters of pottery were never reckoned as great artists—only craftsmen. The Greeks separated art from handicraft, and raised it to the highest level. The earliest forms of vases are to be found in Hissarlik in the North and Cyprus in the South. These present few, if any, traces of metal; no bronze knives were used, only spikes of flint; no wheel was employed, and the clay was coarse and friable, while the shapes were crude, cylindrical, no foot or handle appearing on any of them, except where in a very few a pinch was made in the side, so that that piece being pierced and a string having been put through it, served as a handle. One of the latest of these early vases has three legs. The decoration was rude and scratchy. They were shaped like gourds, or shells, or basket-work. The next stage shows us finer clay, so that the polish is greater, while the last stage of the Hissarlik pottery has decorations of geometrical lines. In the island of Thera were found specimens of early decorated vases, forming the link between this early pottery and that of Mycenæ. Schliemann, of course, has made this site famous by his discoveries, and the classes are easily identified: (1) those vases which are very rough in shape and decoration; (2) those produced by the wheel, and with the peculiarity of Greek pottery, a glazing paint employed. The vases found at Ialysos (mentioned by Homer), and Rhodes may have been produced at one centre; but one main influence was the sea, leading us to believe that there was a great naval power existing then—the octopus, sea-weed, sea-birds, and fishes being represented; (3) those showing a great advance, the glaze of the painting being of a high order. One question naturally arises (Mr. Smith said), which is, how far were these people of the Grecian Islands original in their work; or are the traces found by Mr. Flinders Petrie at Fyûm indicative of an Egyptian source? At first the vases in Mycenæ were of angular form, and gradually they were decorated with horses and birds. One of the latest geometrically-ornamented vases comes from Athens, and is the earliest one *inscribed*, dating from the beginning of the seventh century B.C. In Cyprus the geometric style never died out, Cyprus never having been completely Greek, and it has continued to our own time. At a further stage of the development of pottery the effect of Oriental cylinders and tapestry is seen. The cylinder was rolled over the wet clay all round the vase, giving the Greek artist the idea of the frieze system. There were two main directions from which this importation came, from Egypt by sea, and Asia Minor direct. The Ionian pottery presents a fresh style, although here we have the cylinder and the tapestry effects. If we look at the figures in the Assyrian galleries (said the lecturer) we shall see exactly the same ornaments on the robes as here—friezes of animals. The ground-work is filled in as much as possible with geometric designs, as we see in Turkish carpets. In some vases we see the elongated forms of goats and other animals, and the introduction of new Eastern ideas, the sphynx and the griffin, as well as a tendency to select the top frieze for the introduction of special animals. Mr. Smith also pointed out the introduction of the "rosette" and incised lines for details in the face, &c. He lastly drew attention to a very fine specimen of a plate from Camirus in Rhodes, in which we have the earliest example of a combat scene, the fight between Hector and Menelaus over the body of Euphorbus; and this shows a variation from the Homeric story, as if indicating a still earlier stage of the legend. Here we have incised lines, suggesting metal-work.

Mr. Smith gave the second of his lectures on Thursday, the 12th inst., in the British Museum. He said that as the sites of the Ionian colonies were excavated we should find more of the same kind of fragments of sarcophagi, &c., decorated with friezes of animals, and with a background of rosettes and tapestry figures. At Daphnæ in Egypt we find a strong Asiatic element (from 595-560) forming a transition from the Ionian style to the immediate precursor of the black figured system. Here we have such representations as that on one vase, the winged god Boreas, exactly corresponding to a description given by Pausanias. There was a great deal of influence from Corinth in the earlier work. Next to the pottery at Daphnæ was that of Chalcis. The principal seaport of Corinth was in the western bay, and from thence it pushed its trade; and very much during that age is due to Corinthian influence. Mr. Smith then spoke of the Italian local school, and said we could see there the Greek style of combat-scene, and an Oriental or un-Greek characteristic of making the decoration out of proportion to the vase. It is chiefly *hydriæ* which are found here. On one of these there is represented a Græco-Egyptian myth—Heracles and Busiris, an Egyptian king, in conflict. On another vase we have more combat-scenes, corresponding exactly with such as we find on early tombs in Etruria; and while in some pottery we have dancing figures exhibiting Greek art, several of the dresses suggest local Italian influence. An interesting vase, here pointed out, is one with a frieze of birds and a combat between Heracles and some foe, while a goddess stands near him clothed in a goat-skin, and with the *horns over her head*. The ægis was originally a goat's skin, and this would indicate Athene herself; the nearest parallel type is the Latian Juno Sospiter. Mr. Smith then referred to what is known as the "Archiselaos cup," and spoke of its gorgeous colouring, presenting a somewhat bizarre effect on the light ground. King Archiselaos is represented as watching the weighing of the silphion before it is stored away. Much of this style was borrowed from Egypt, as may be seen from the papyrus Books of the Dead; but Corinthian ideas are quite visible. The best instance of Cyrenian vases is one in which the central female figure is that of the nymph Cyrene herself holding the apple-bough, while there is a scene showing winged figures (the sons of Boreas) approaching to attack the harpies. Mr. Smith said that some tall, slender amphoræ he pointed out, show what Athenian pottery was at this period (the early part of the sixth century), the shoulders being reserved for human mythical figures. The fabric from Chalcis is only identifiable by inscriptions (marked by an alphabet peculiar to Chalcis), and is strongly under the influence of metallic forms. The hunt of the Calydonian boar in some of these vases occupies the whole field. About 560 B.C. we have a definite Athenian style, and from this point Athens was almost the sole producer of these vases. One representation is the birth of Athene from the brain of Jupiter fully armed—Vulcan springing away amazed. Another is that of Perseus fleeing after cutting off the head of the Gorgon—a favourite topic of Athenian vase painters. A third shows a procession of the gods to the marriage of Peleus. Mr. Smith then spoke of Panathenaic pottery, made only at Athens, and prepared solely as prizes for the Panathenaic games. On one side of a vase there is—sometimes Athene herself, on the other a chariot race. The history of the black painting on a red ground is the struggle between the black varnish and the red clay. The black clay was used for handles and feet and a small portion of the body. In the next stage the black glaze comes down and meets the black glaze below. Before the panel system was introduced, the artist had a difficulty in filling up the whole field, and, in order to give him a square place, he placed a column on each side. Another plan borrowed from Egypt was to use the sacred eye of Osiris to fill up the blank spaces. This style lasted for about a century after this. Some artists placed boughs of trees in the background. Dionysos is often seen on this pottery, with vine branches in his hand and spread all over the vase.

On Thursday, the 19th instant, Mr. Smith delivered the third lecture of the course. He said that all through the sixth century and the greater part of the fifth, the great object was to decorate the vase as fully as possible with whatever kind of painting would suit its form. This was the beginning of the decline—the mere striving after pictorial effect. A large number of figures were introduced, as we have a wedding procession on the François vase. The vases used thus are generally amphoræ, as the handle coming down on each side naturally forms a panel on the reverse and obverse. The hydriæ suggest a similar treatment, and the black-figured style lasts longest in these shapes. The kylixes, being peculiar in form, suggest an exterior and interior decoration. They were hung on the wall, and the frieze went round the lip. But when the vases were standing on their feet, the great difficulty was to deal with the inside. One, therefore, presents two figures of Silenus placed head to feet. In cups many artists have declined to attempt more than to decorate with the old band or frieze of animals. In some we have combat scenes, and also spectators. The "eye" spoken of in last lecture was also used to fill up the space. Several have only a band and a sentence addressed to the owner, such as "treat me well." The difficulties referred to led the artists to use another device, and thus in the kylixes we meet the new style of red figures. Mr. Smith then pointed out several specimens of the *alabastron*, evidently copied from certain vases of alabaster containing unguents imported from the East. These were decorated with Libyan subjects, and generally bore the signature of the artist,—not his name, but his birthplace; one, for example, calls himself Nicosthenes (two vases signed by him are in the Louvre). These are all distinctly under Egyptian influence. We find quite a peculiar treatment of a circular space. Outside there is, *e.g.*, a hunt, and inside a frieze of animals, a system inspired by Phœnician bowls. One vase bears a representation of a central figure—Hermes—looking on at two combatants; he has scales in his hands, and little objects are to be seen in the scales, evidently meant for the souls of the combatants,—manifestly an idea of Egyptian origin. Mr. Smith then referred to one vase with brilliant blue-black glaze, where the figures are not left in the natural colour of the clay, but painted. One vase has the interior white, painted on red. The commencement of the red-figured style, once thought to be about 480 B.C., is now known to have been 520 B.C. at least; the evidence is from the excavations at the Acropolis, and from the style of their decoration. Some vases are in the red-figured style on one side, and the red and black on the other. The artist took the vase as it came from the pottery, and first used an ivory tool on the moist clay; we can see the sketch marks still, and alterations made on them. One peculiarity is that whatever he draws, he draws throughout, for we can trace the form of the arm anatomically correct underneath a shield figured over it. He then took a fine brush with a little colour, and went over his corrected outline, while an inferior workman filled in the black ground. The vase was next partly baked, and the details worked in with black paint. Another peculiarity of the red-figured style was the treatment of the eye. In the other style it was marked only, engraved, and was like a bird's eye, while here it was painted in, so that, however the looker-on moved, he got the same effect. Pliny says that Cimon of Cleone "invented" this treatment. The kylixes were probably the first of the red-figured style. The hair, of course, in this work must be black, and the old device of graving lines was resorted to; but some artists left the head in outline, and gave a realistic idea of the hair by painting it a fine brown. Immediately after Sophocles Theseus constantly appears, having become the favourite hero of the Athenians. Mr. Smith then spoke of the influence of the great painters (such as Polygnotus) on pottery decoration, painting being at this time under the influence of sculpture, and pointed to several vases with rich colouring on a white ground, as well as gilding. This period is marked by the introduction of fresh colouring.

The next lecture will have reference to the polychrome effect, showing the later art of vase-painting to be but a weak imitation of the higher art.

UNIVERSITY EXTENSION SOCIETY, EPSOM BRANCH.—A meeting of the members of this Society took place on the 20th inst., when Mr. Hatchard Smith, A.R.I.B.A., read a paper on "Domestic Architecture," describing the best specimens of existing buildings from the thirteenth century. The subject was illustrated by a large number of drawings.

THE ARCHITECTURAL ASSOCIATION.

A SPECIAL general meeting of this Association was held on Friday, the 20th inst., at 9, Conduit-street, for the purpose of approving of the new Constitution and By-laws as amended by counsel.* Mr. Leonard Stokes, President, was in the chair.

Mr. E. S. Gale (Hon. Secretary) read the minutes of the three special meetings held to consider the subject. These minutes were confirmed.

The Chairman said that in *A.A. Notes* for March would be found printed the Constitution and By-laws as verbally amended by counsel. Since, however, they had been in print, counsel had again seen them, and had suggested a few further amendments. These were as follow:—

At the end of Article I. of the Constitution, these words were to be added: "or any statutory modification thereof at the time being in force."

At the end of Article VII. of the Constitution, to erase the words "to By-law XIII.," and insert the word "thereto."

At the end of Article XIV. of the Constitution, to add the words "or any statutory modification thereof for the time being in force."

In By-law XVIII. for "roll of members" read "register of members."

In By-law XXVII. delete the word "And" at the beginning of the last sentence, and then let the sentence read "All cheques on the account of the Association shall be signed," &c.

At the end of By-law XXIX, for "ensuing session" read "current session."

In By-law XXXV, transpose the word "so" at the end of the last sentence but two, and let it read thus: "each member so nominated being nominated by," &c.

In the first line of By-law XXXVI, delete the word "sole."

In By-law XLVI, for "affiliated society" read "allied society."

At the end of By-law XLIX, add the words "or any statutory modification thereof for the time being in force."

The Chairman said it was therefore now his duty to propose that the new Constitution and By-laws as amended by counsel should be formally adopted by the Association.

This was agreed to unanimously, and the special general meeting terminated.

The ordinary fortnightly general meeting was then held.

Mr. E. S. Gale (Hon. Secretary) read the minutes of the previous meeting, which were confirmed.

The Chairman announced that Mr. Gotch had kindly presented to the Association the first part of his valuable work on "The Renaissance in England." A vote of thanks was accorded to the donor by acclamation.

Mr. E. S. Gale said he wished to propose a cordial vote of thanks to Mr. Wolfe Barry, the engineer of the Tower Bridge, for permitting the members of the Association to visit the works of that structure on the 14th inst., and to Mr. Crutwell, the resident engineer, for having so kindly conducted them over the works. This was agreed to by acclamation.

Mr. Gale next announced that the visits for April would be as follows:—On Saturday, the 11th, to Mr. Brooks's church, in Holland-road, Kensington, and on April 25, to the new Weigh House Chapel, Duke-street, Grosvenor-square, when Mr. Waterhouse, the architect, had kindly promised to meet them and take them over the building.†

The Chairman next announced that, in consequence of certain difficulties which had arisen, it had been found necessary to postpone the members' *soirée* from April 10 to May 8.

Mr. H. V. Lanchester then read a paper on "Spanish Architecture," the substance of which, with some notes of the discussion which followed, we give on another page.

Mr. Horace Townsend next read a paper entitled "The House that Jonathan Builds." This paper, together with some notes of the discussion, we hope to give next week.

The meeting then terminated.

The second "Students' dinner" was held at the Piccadilly Restaurant on the 14th inst., when fifty-two guests assembled. The President of the Association, Mr. Leonard Stokes, who occupied the chair, invited the co-operation of all members in the work of the reorganisation of the Association, and stated that the Committee were most anxious to hear both individual

* The text of the new Constitution and By-laws before being submitted to the revision of counsel, will be found in our reports of the various meetings held to consider the subject. (See the *Builder* for December 20 and 27, 1890, pp. 481 and 496, and January 24, 1891, p. 67.)

† We may mention that we gave a double-page view of this building in the *Builder* for January 18, 1890.

Gifford's Hall, Suffolk: A "Restoration" Sketch.

and collective expressions of opinion in this matter. Three toasts only were proposed, the last being "The Students' Committee and their Chairman, Mr. Earle," proposed by Mr. S. B. Beale, and supported by Mr. C. H. Brodie. In replying, Mr. Earle explained that the hope of the Students' Committee was "to introduce some social element into the life of Architectural Association students, and to discover, organise, and utilise the talent and enthusiasm of juniors, for the benefit of the Association and all its members."

GIFFORD'S HALL.

GIFFORD'S HALL, near Stoke-by-Nayland, on the borders of Suffolk, was a residence of the Manack family from the days of King Stephen. On the family leaving the residence about 1826, and letting the place to a tenant, they built a new chapel (the old one having been destroyed by the Puritans) on the border of the park, and endowed it with a part of the park land as a glebe. The hall was besieged, and the roofs and most of the chimney-stacks damaged or destroyed, and rebuilt in the most economic form; the original gable pulled down, and the roofs reconstructed from the wreckage, supplemented by unwrought timber cut on the estate. This property came to the hammer in November of last year, and was purchased by the present owner.

The Hall surrounds a quadrangle, on plan an irregular-sided oblong, the north and much of the east side being timbered construction, probably no later than Edward III. About the middle of the east wing is the great banqueting-hall. Brick walls and mullioned windows of the Perpendicular period, and a large round-headed sash-window of the Georgian era. The roof is oak, open-timbered, massive, and rich in carving of bold treatment; and there is a wide arched fireplace and fine external chimney-stack, carrying two fine moulded brick shafts high above the roof. This has suffered little from accidental injury. This chimney has a square-headed Perpendicular window of two lights, inserted high over the fireplace, and deeply-recessed without, splayed deeply down on the inside; a minstrels' gallery runs across the south end of this hall, where also at the south-west corner is the main entrance, with a fine exterior porch in brick, much disfigured by plaster and colour-wash. A carved beam at level of the floor, of contiguous portions of this wing, indicates it may have been half-timbered work above. It is finished with an Elizabethan gable, a casement window of uncertain date, with a Renaissance carved sill, gives light along the minstrels' gallery, which has doors communicating with landing of the grand staircase, and other apartments, whilst a door on the floor of the hall opposite the main entrance gives access to the grand staircase, which is of three broad flights of stairs. The original Perpendicular woodwork has been altered, or otherwise replaced by clumsy, late Jacobin or Georgian balusters and handrails, &c. The timbers of the ceiling have the moulded lofts cut off flat, and the spaces between are plastered to give a greased classic appearance. The large kitchen and offices are in a wing at the back of this, with bed-rooms above walls of brick, and many sash-windows added. Similarly with the south wing, forming the chief residential part of the premises, modernised to the end of the Georgian era, only a good plaster ceiling of the last century's date claiming notice. On the west side is the entrance gateway, with semi-octagonal flanking towers in red brick of the Perpendicular period, it may be early Tudor, it is in two stories, only the towers forming window-bays to the rooms within. The ornamental patterns in brick resemble that at Falkturn Hall, and the residential parts of S. Osyth's priory in Essex.

The timbered portions of the house are of especial architectural interest, the wood being much of chestnut of extra large scantlings, and in place of brick nogging much of the filling-in between timbers, particularly in the inside partitions, is, and was, done in clay mixed with straw and fine twigs, and seasoned as hard as terra-cotta. All doorways had four-centred arch heads in timber, cut from the solid, likewise boldly-projecting corbelled exterior sills to windows; all main beams showing inside are boldly moulded and richly carved, with an artistic freedom more resembling transition decorated work than usual Perpendicular; the north side is apparently the exterior work. The contiguous part at the north-east angle has fine carving externally, on horizontal timbers. The building is now stripped of the lath and plaster sham front, done during the "classic craze" in architecture; when the fine corbelled sills were chopped off and all projecting carved woodwork, and nondescript windows inserted in some parts. Fortunately sufficient traces were left to see what the details formerly were, as shown on the drawing accompanying these notes.

In this connexion it may be useful to note observations of the writer in examining full fifty separate cases of repairs to old-timbered houses in this neighbourhood during the past few years. In every instance "dry rot" had taken the timber work after having been covered up by plaster, whilst the exposed parts often are quite sound, or little decayed, although weatherworn, as were the other timbers at time of being plastered over, all weather marks defining grain of the wood and cracks, &c., appeared intact; but the wood crumbled to the touch,—in some parts it had become almost shapeless masses of dust. Unfortunately, such is the condition of much of the timber-work at Gifford's Hall, the inside partitions, which have been plastered over, suffering as much or more than the timbers of outside walls from dry-rot, whereas the beams and moulded ceiling joists in rooms that have not been covered up from the air are well-preserved, even the chips and splintering from the "Vandal's axe" show as fresh as if recently done.

A pen-and-ink drawing of the north-east

angle of the court-yard is given, showing what the buildings probably were like up to time of the siege by the Parliamentary forces. Every evidence exists for the reconstruction of gables and minor parts, and, judging from the ornamentation to existing exterior timbers, verge boards, &c., were enriched in design originally; but nothing is anticipated in the sketch which is carried out in generalities, only as regards obliterated details. The rational reason for gables with gutters between roofs, transversely to the faces of the building, is to carry rain water outside, whereas roofs longitudinally carried half to the "water shed," to be deposited in the quadrangle, which, in this case, had to be drained out under the buildings, next the roof spaces may afford room for attics; extra height and apparent dignity, with a pleasing sky line of building. The timber construction throughout is admirable carpentry, put together by wood trenails and pins, not a spike bolt or strap, mortices and tenons in every required degree or varietv, such as "Thomas Tredgold" delighted to describe, much of these details have come to light through "recasting" of interior of the building, the wood sound, and joints as true as when first done. The plain or straight parts could be used in rebuilding, and if only the joinings cut off as waste could be preserved to technical schools as examples to carpenters and joiners, it would be a valuable means to meet a pressing need of this time, especially as the Government has voted a munificent sum towards improving technical education in this country. B.

THE LONDON WATER QUESTION.

IN accordance with the resolution of the London County Council, printed in our last issue (see p. 230, *ante*), Sir John Lubbock, the Chairman of the Council, gave notice in the House of Commons on Friday, the 20th inst., of his intention to bring in a Bill to confer powers upon the Council with respect to the supply of water, the intention being that, when brought in, the Bill shall be referred, together with the five or six other Bills on the question which are now before the House of Commons, to the Select Committee to whom the London Water Commission Bill was to be referred.

As to the constitution of this Committee, we may here mention that in the House of Commons on the 18th inst, it was resolved, on the motion of Mr. Ritchie, the President of the Local Government Board, that Mr. T. H. Bolton, Sir Algernon Borthwick, Mr. Bristowe, Mr. Lawson, and Mr. Murdoch be members of the Committee, four more members to be added by the Committee of Selection. On the following evening Mr. Ritchie moved

"That it be an instruction to the Committee on the London Water Commission Bill that they have power to inquire into all matters connected with the nature, price, management, sources, and sufficiency of the water supply of London and its suburbs, and to insert in the Bills such provisions in connexion therewith as in their judgment are expedient."

In the discussion which followed, Mr. Causton suggested that it should be a further instruction to the Committee that they should inquire first into the subject of the Metropolis Water Charges Bill, which had already been referred to it. There was a likelihood, he pointed out, of an increase in the charges in respect of water in consequence of the quinquennial revaluation coming into operation on April 6. If the revaluation should be permitted to come into operation there would be a fresh charge of 40,000*l.* annually on the ratepayers of London. The matter was therefore very urgent.

Mr. Ritchie, in reply to this, said that it was perfectly true that the House had read the Bill to which the hon. gentleman had referred a second time, but it was well understood that it did so not to commit itself to the measure, but in order that the Bill might be sent to the Committee. The hon. gentleman said that unless what he proposed was done, the revaluation would come into operation on April 6. In that case, no action which the Committee could take would prevent the revaluation from coming into operation, because the Committee could not possibly report in time to prevent it. The Bills were of enormous importance, and must be left to the Committee to decide upon. Therefore he could not assent to the suggestion.

Sir John Lubbock asked whether, under the instruction as framed, the Committee would be able to inquire into the efficiency, condition, and value of the works, and, if not, whether he would introduce words to that effect? As regarded the suggestion of the hon. member for Southwark (Mr. Causton), he hoped the Committee would see their way to consider the point at an early stage of their proceedings.

After Mr. Ritchie had replied, to the effect that he thought that the terms of the "instruction" comprehended everything necessary to be inquired into, the motion was agreed to.

This is the position in which the question, regarded as a whole, now stands before Parliament. We are obliged to hold over our promised *résumé* of the Special Report of the Parliamentary Committee of the London County Council on the subject until next week.

THE FRANKFORT ELECTRICAL EXHIBITION.

As stated in a recent issue, a great electrical exhibition is to be held at Frankfort-on-the-Main, between May 15 and September 15 next.

Germany holds at present, in the field of applied electricity, such a prominent position that an attempt will be made to make this exhibition demonstrative of that position, to which must be added a desire for triumph over the Paris Electrical Exhibition of 1881, which was attended with such success.

The site for the exhibition will be close to the new central railway station. There are at present in course of erection a number of buildings of which the principal will be the great machinery hall, in which will be mounted every kind of dynamo, which will also furnish the motive force for sundry purposes in the exhibition. In another part of the grounds a long thoroughfare of workshops will be constructed, in which will be shown the numerous manufacturing and industrial purposes to which electricity is now applied. The necessary motive power for this will be furnished partly by the dynamos referred to and partly by waterfalls in the Taunus mountains, in order to demonstrate the manner in which electricity may be generated by the same, and the current carried to distant parts for utilisation. From this part of the exhibition an electric railway runs down to the River Main to the exhibits in the latter, viz., a lighthouse lighted by electricity and craft propelled by the same force.

A building is to be specially set apart for the illustration of the purposes to which electricity may be applied in every-day life. Here will be found telegraph and telephone apparatus and electric lighting apparatus, &c., of every kind, and the installation of the latter will show their most favourable application for the lighting of shops, large public rooms, theatres, &c.

Moreover, in a separate section, will be shown the enlistment of the light in the services of art and science.

COMPETITIONS.

THE BATTERSEA POLYTECHNIC.—The Committee of the South London Polytechnic Institutes, have, after a most carefully conducted competition, by an almost unanimous vote selected Mr. Edward W. Mountford as the architect for the Polytechnic Institute, which it is intended to erect at Battersea on a site of 2½ acres facing the Battersea Park-road. We illustrate this design in our present issue. It is stated that the six sets of plans submitted were all of very high merit, and the Goldsmiths' Company have very kindly promised to lend their hall at an early date in April for their exhibition. The 13th of April, we believe, is the date fixed.

PROJECTED NEW CHURCH, HAM HILL, BIRLING.—We learn from a Kentish paper that the Ham Hill Church Building Committee has selected the designs of Mr. H. Percy Monckton, of London, and nominated him as their architect for the erection of Christ Church, Ham Hill, Birling, near Snodland.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION: ELECTION OF AN ORPHAN.—A special general meeting of the donors and subscribers of this Institution was held on Tuesday last at the office of the Institution, 21, New Bridge-street, E.C., for the election of a child for presentation to the Orphan Working School, Haverstock-hill. The President, Mr. Benjamin Hannen, junr., who occupied the chair, stated that Cyril Ludford, being the only candidate, would be proposed for election by show of hands. Some particulars of the case having been given, Mr. E. C. Roe proposed, and Mr. C. K. Turpin seconded, that the child be elected, which was put and carried unanimously. Mr. A. A. Stanger returned thanks on behalf of the little one, who was present with his mother. There will shortly be another vacancy for a builders' clerk's orphan. The meeting closed with a vote of thanks to Mr. Hannen for presiding on the occasion.

Illustrations.

FOUNTAIN OF CHARLES V., AND TOWER OF SAN PEDRO, SEVILLE.

THESE two illustrations are reproduced from two of the drawings made by Mr. H. V. Lanchester during his tour as Owen Jones Student of the Institute of Architects. They are printed in a light warm tint in order to preserve, as far as may be in monochrome, something of the warm and sunny effect conveyed by the colouring of the original drawings.

The fountain is one of the Classic additions made in the neighbourhood of the Alhambra in the time of Charles V., probably at the same time when the large ugly palace was built which cuts diagonally across the outskirts of the Alhambra courts, opposite to and practically stopping up the original Moorish entrance to the court of the Alberca. The fountain is just outside the enclosure of the Alhambra grounds, the roadway up to the "Gate of Justice," seen in the background, being on the other side of the wall which forms the continuation of the Fountain erection.

The Tower of San Pedro at Seville is very much on the model of a common form of Italian campanile, with an enriched story above a plain stalk, and an octagonal lantern above that. The proportions of the tower, however, differ from the usual Italian type in the fact that the stalk is not so lofty in proportion to the superstructure as is usual in Italy; and its effect is further somewhat weakened by the introduction of the window openings and balconies, which rather detract from that stern solidity of expression which is characteristic of the Italian campanile of this type.

SOUTH LONDON POLYTECHNICS:

THE BATTERSEA INSTITUTE.

THIS design (selected after a double competition) has been prepared in accordance with instructions framed by the Committee, who had the advice and assistance of Mr. Rowland Plumbe, F.R.I.B.A.

The building is to be erected upon a site of over two acres, fronting the Battersea Park-road, and having other roads upon the remaining three sides. The cost is estimated at 40,000*l.*, exclusive of fittings.

In preparing the plans, it has been endeavoured to obtain perfect straightness and simplicity of the corridors, together with such arrangement of the various departments that though all are kept perfectly distinct and separate, they are brought into direct communication with the principal entrance and each other. The lighting of the various rooms and corridors has also been very carefully considered.

The concentration of each department was another point to be arranged. The Technical Class-rooms all adjoin each other on the first floor, as do the Art Class-rooms on the floor above, all the latter having large north lights. The Music-rooms occupy the whole of a floor of one projecting wing, the Laboratories doing the same in another. The various rooms of each social department (for men and women respectively) adjoin each other, the refreshment rooms for each being in direct communication with the kitchen.

The great hall is arranged so that it may be let for any purpose without in any way interfering with the use of the Institute, and numerous exits are provided on all sides.

The following accommodation is provided:—

Administrative department	4,180	sq. ft. in area
Technical education (including art rooms)	24,600	" "
Physical	7,500	" "
Social recreation	5,300	" "

In addition, the great hall provides accommodation for 1,200 persons and a large organ, with every convenience for a chorus and orchestra.

It is proposed to use red bricks for the wall-facings, with terra-cotta dressings, and brown Brosely tiles for roofs. The floors of corridors and all staircases are to be fireproof. The building will be heated on the low-pressure steam principle, and lighted by electricity.

WELL-HEADS, ITALIAN RENAISSANCE.

BRONZE cisterns or well heads are not common in Venice, marble being the usual material. The two finest in bronze, one erected in 1556 by

Nicolo de Conti, the other by Alfonso Alborghetti in 1559, are both in the courtyard of the Dogé's Palace. They received but little injury during the fires in 1574 and 1577 which destroyed the courtyard of the palace.

The one given on our plate shows the characteristic features of the later Cinque Cento ornamentation in the terminal figures holding wreaths, which was largely introduced into French Renaissance ornament.

The marble example is from a series now in the museum at Venice, and it shows a peculiar treatment of the figure introduced with the acanthus foliage together with heads of lions and a female head at the angles. The carving of the whole is vigorous and skilful. This cistern was erected in the courtyard of the Church of SS. Giovanni e Paolo, Venice.

RICHARD GLAZIER.

THE NEW SWEDISH HOUSES OF PARLIAMENT AND BANK OF SWEDEN.

A COMMITTEE having been charged by the Swedish Parliament of 1888 with inviting designs for the new Houses of Parliament and Bank of Sweden, to be built on the so-called Helgeandsholm, situated in the stream that flows through Stockholm, and in the immediate vicinity of the Royal Palace, the Princes' Palace, and other monumental buildings, that body framed a programme, and invited Swedish architects to compete; but, as previously stated in our columns, no design tendered met with the full approval of the jury. In consequence, the Committee was empowered to commission one of its members, Herr Helgo Zettervall, an eminent architect, and chief of the Crown Building Office, to prepare designs and plans for the new buildings. The front and side elevation of the main design, and the plan for the Houses of Parliament, are illustrated in this number; in the succeeding number we will give the back elevation, showing the Bank building, with the plans of the two principal floors.

The Houses of Parliament are entered through the open portico forming the central section of the main façade, the portico leading into a vestibule, which is a lofty hall running through two stories and lighted from above. From the sides of the hall stairs lead to the upper and lower stories, whilst on a level with the vestibule are the *foyers* of the Houses and the refreshment bars. Just opposite the great entrance archway to the vestibule, a vaulted gallery opens leading to the common hall, the rooms of the Presidents, Cabinet Ministers, &c. Adjoining the gallery referred to are the cloak-rooms, dressing-rooms, &c., which are partly lighted from the courtyards and partly from the vestibule and the *foyers*—whence these rooms are also freely accessible. The main entrances of the two Houses are from the *foyers* and the side entrances, partly from the gallery referred to, whereby both Houses are conveniently connected, partly from the end corridors, while the club-rooms are closely connected with the Houses to which they belong. The club-rooms are in turn connected with the *foyers*, partly through the corridors referred to, and partly through the refreshment-roooms. Separate entrances are provided for the Presidents, Ministers, &c., at the back of the tribunes. In each House there are two large boxes below the public galleries, for the use of distinguished visitors. The legislative chambers are lighted partly from above, and partly through four great windows at the sides, looking upon the courtyards. The offices of Parliament are confined to the wing abutting on the Drattninggata Passage. Separate staircases lead to the same from the vestibule on the ground-floor, as well as to the stories above, and they are lighted from above. These offices are also conveniently connected with the rooms of the Presidents, and, through the library, with the club-rooms. A fifth staircase, common to all stories, is found in close proximity to the common hall, as well as lifts in convenient places. The staircases for the press, the general public, and distinguished visitors are not accessible from this part of the building. Five staircases lead to the top story, no main staircase being required for the offices and committee-rooms situated here. On this floor are situated, but distinctly apart, the public galleries for both Houses, the diplomatic gallery, and the press gallery. The latter communicate with each other, and to each are attached two writing-rooms, telephone, and cloak-rooms. From this floor there will be several reserve exits for use in case of fire or panic. On the upper floor are also found the library and the offices attached thereto. A lift runs from the top to the bottom of the building here. To the bottom floor of the building there are several entrances, and here are located the principal restaurant, certain offices connected with the treasury, telegraph, and telephone offices, besides others.

The Bank of Sweden will form part of the Parliamentary building, and be built in a semi-circle on the opposite side towards the Vasa Bridge.

As regards the construction and execution of the buildings, the material used will be granite, sandstone, and limestone for the exterior, iron for the roof—which is to be sheeted with copper, and cement and iron for floors and walls. Naturally, all the rooms in the bank building will be fireproof. The entire building will be lighted by electricity and heated with steam.

This building enterprise is the greatest which has taken place in Sweden since the building of the Royal Palace. The cost of the structures is estimated at about 380,000*l.*, but this does not include the cost of the site—a very valuable one, as being situated in the most central and fashionable part of the Swedish capital. This site belonged to King Oscar, who, taking a lively interest in the undertaking, has generously presented it to the nation. The value may be estimated at some 50,000*l.* at least.

The new buildings will form an angle with the Royal Palace, facing the Grand-square of Gustavus Adolphus.

References to Plan of Parliament Houses.

1. Drattninggata Passage (principal street in Stockholm).
2. First Chamber (seating 186 members).
3. Second Chamber (seating 212 members).
4. Cabinet Ministers.
5. Common Assembly Room.
6. Vestibule.
7, 8. Foyers.
9. Reporters' Room.
10, 11. Restaurants.
12. Newspaper Room.

DESIGN FOR SCHOOL.

IN furtherance of the policy inaugurated by the Welsh Education Act of 1889, Mr. Henry Tate placed at the disposal of the Committee for North Wales a considerable sum of money, part of which was to be expended in procuring typical designs for schools. As the system of instruction under which knowledge is to be imparted to the pupil was,—and still is,—undecided, the particulars issued to architects were necessarily of a somewhat shadowy nature. No site, real or imaginary, was given, and, except that a building providing for the intermediate and technical education of 100 scholars from twelve to sixteen years old at a cost of 2,000*l.* was to be planned, the designer was left free to evolve for an ideal system an ideal plan, upon an ideal site. Four equal premiums of 20*l.* each were offered, one of which was awarded to the design illustrated. The plan consists of a large hall, on the eastern side of which are placed three class-rooms, fitted with single desks and giving a floor space of 15 ft. per scholar; rooms and lavatory for head- and under-masters, and a book store are at the southern end, with the school entrance adjoining on the west; while at the northern end of the hall are placed a music-room, carpenters' and smiths' workshops, and on the upper story chemical and physical laboratories and an art school. Lavatories, &c., and a large dressing-room are placed in a block separate from the main building; cloak cupboards only being provided round the hall.

THOS. EDWARD PRYCE.

THE MANCHESTER SHIP CANAL.—It is stated in the *Times* that the Manchester Ship Canal Company have decided to present a petition to Parliament as soon as possible after Easter for leave to introduce a Bill authorising them to raise a further sum of three millions for the purposes of their undertaking, the interest on the proposed loan to be guaranteed by the Corporation of Manchester on the credit of the rates. Copies of the draft Bill have been sent to Manchester, and in due course notices of the intention of the Company will be advertised in the London and Manchester Press and in the *London Gazette*. The statutory time for the introduction of private Bills having elapsed, it will be necessary for the Standing Orders Committee to consider the petition in order to decide whether the case is one for dispensing with the standing orders.

THE LONDON COUNTY COUNCIL.

THE last weekly meeting of the London County Council prior to the Easter recess was held on Tuesday afternoon in the County Hall, Spring-gardens, the Chairman, Sir John Lubbock, presiding.

The Housing of the Working Classes.—The Housing of the Working Classes Committee brought up an important report as to the method of dealing with unsanitary areas and for facilitating the erection of sanitary dwellings upon all such areas dealt with by the Council. The recommendations of the Committee were as follow:—

"1. That the Council, in all cases when satisfied upon report made by the Housing of the Working Classes Committee that a scheme proposed by resolution of a Vestry or District Board is one which it is proper should be dealt with under Part 2 of the Housing of the Working Classes Act, 1890, and be contributed to by the Council, and subject to the necessary estimates to be submitted to the Finance Committee, do contribute from one-fourth to one-half, according to the circumstances of each case, of the net cost of carrying into effect such schemes.

2. That the total expenditure sanctioned on the part of the Council by way of contribution for the year ending December 31 next be limited to the sum of 50,000*l.*

3. That the Finance Committee be instructed to consider all applications made to the Council by district authorities for loans to meet expenses incurred in carrying out schemes under Part 2 of the Act of 1890, with a view to loans being made for this purpose as authorised by section 46."

Mr. Beachcroft proposed the following amendment to the first recommendation:—

"That it is highly desirable that the provisions of part 3 of the Housing Act, 1890, under which the Council is empowered to acquire land for the purpose of erecting houses or cottages for the working classes, should be extended so as to allow of land when so acquired being leased to companies or persons willing to erect dwellings under and subject to conditions imposed by the Council; that a petition be presented to Parliament accordingly, with a view to such alteration of the law as is required, and that it be referred to the Parliamentary Committee to carry out this resolution."

After some discussion,

Mr. Harrison stated that Mr. Beachcroft was willing to withdraw his proposal in favour of the following:—

"That the resolution, as framed by the Committee, is not satisfactory, and that the following be substituted—'That the Council do contribute to schemes under Part 2 of the Housing of the Working Classes Act, 1890, when such schemes deal satisfactorily with unsanitary areas, and when need of such contribution is shown to the satisfaction of the Council.'"

Mr. Harrison's proposal was carried, as against the first recommendation of the Committee. The second recommendation was withdrawn, and the third agreed to.

The Site of Millbank Prison.—The adjourned report of the Housing of the Working Classes Committee, in reference to the Millbank Prison site, stated that on November 19 the Council resolved that a letter be addressed to the Secretary of State inquiring whether the Government would be willing to dispose of eight acres of the site for the erection of artisans' dwellings at the price of 2,000*l.* per acre. The answer received was to the effect that the Secretary of State was advised that there was no plot of land on the site for which 2,000*l.* an acre would even approach the fair market price, which the statute bound him to ask. In order to decide the value a valuer appointed by the Government met the Council's Valuer, and whereas the first placed the value at 5,500*l.* the other put it at 5,000*l.* The Committee had now received an offer of the eight acres for 40,000*l.* The Committee had, however, to take the following facts into consideration:—1. It was agreed by both valuers that the value of the whole site was 5,000*l.* an acre. It seemed reasonable to conclude that the part at the back must be worth considerably less. 2. The cost of purchasing the approaches might add to the price. 3. The Valuer considered that, if the Council were to purchase the land for 4,000*l.* an acre, and offer it to artisans' dwellings companies, subject to the building conditions of the Council, there would be a loss of about 11,000*l.* (without special permission by Parliament the Council would be obliged to build and hold under Part III. of the Housing Act, 1890). 4. The uncertainty of the cost of the foundations. 5. The uncertainty as to whether the Home Secretary would consider the site as providing accommodation for persons displaced by schemes perhaps at some long distance away. 6. The giving up of an acre to roads and an open space. For the first four reasons the Committee had come to

the conclusion that a fair price for the eight acres in question was 24,000*l.* When the back portion of the site (for 3,000*l.* an acre) was laid out by the Council, and by the making of approaches one side of the whole site had been opened out, an increased value would attach to the remainder of the site, which might make the average on the whole to exceed 5,000*l.* an acre. The Committee therefore recommended—

"That a letter be addressed to the Secretary of State in the above sense, accompanied by an offer of 3,000*l.* an acre for the eight acres being the back portion of the Millbank Prison site."

Mr. Beachcroft moved an amendment to refer the report back to the Committee, with an instruction to consider whether 4,000*l.* an acre would not be a fair price to offer for the site or a part of it. The amount proposed to be paid by the Committee was totally unreasonable, and if they meant to do business they should make a reasonable offer.

This amendment, and others which followed it, were lost, and the recommendation was ultimately agreed to.

Proposed Purchase of Tramways.—The Highways Committee reported that they were unanimously of opinion, upon the estimates and evidence placed before them, and upon the legal advice given to them, that the purchase of the London Street Tramways Company could be effected without any risk of loss to the ratepayers. They were also of opinion that the transfer of ownership to the Council would be a public benefit, and would satisfy a widely-felt public desire, and they therefore recommended:—

"(*a*) That the Council do, under the statutory provisions in that behalf, exercise its right to require the London Street Tramways Company to sell to the Council the tramways and works and undertaking authorised by the London Street Tramways Act, 1870; (*b*) that the Clerk be directed to call the proper statutory meeting of the Council, required by the Tramways Act, 1870, in order that the Council may consider the matter, and, if it sees fit, pass the necessary resolution for the purpose referred to."

The former of the foregoing resolutions, if adopted, would be merely a preliminary approval of the principle of purchase, but it would not bind the Council to proceed with the actual purchase, since for that a special meeting would be necessary.

This was agreed to.

Sky-signs.—The first paragraph of the report of the Building Act Committee was as follows:—

"1. We desire to report, for the information of the Council, that we have unanimously passed a cordial vote of thanks to Mr. Arthur Cates, one of the Vice-Presidents of the Royal Institute of British Architects, for the valuable assistance afforded by him in giving evidence before the Committee of the House of Commons upon the Council's Sky Signs Bill."

Having transacted a great deal of other business, the Council adjourned until Tuesday, April 7.

FREE LECTURES TO ARTISANS AT CARPENTERS' HALL:

MR. THOMAS BLASHILL ON "THE CARPENTER AND THE HOUSE."

THE fifth lecture of this series * was delivered on Wednesday evening, the 11th inst., by Mr. Thomas Blashill, F.R.I.B.A., his subject being "The Carpenter and the House." The chair was occupied by the Rev. Henry Wace, D.D., Principal of King's College, and there was a good attendance.

The lecturer commenced by observing that things innumerable might be said in praise of the house. From the darkest ages each separate section of mankind emerged to our view ready-furnished with its own special form of house, that had developed with its growth and expanded to its wants, fitting itself upon the family just as the garment was fitted upon the man. The house had made frozen regions habitable; it had made the tropics tolerable, and under its shelter civilisation had sprung up, blossomed, and borne fruit. It had been the parent and nurse of industries. Generations of craftsmen had lived and thriven by it, calling themselves its builders,—more truly they might admit that it had built them. It created the carpenter; it had endowed him with axe and saw, chisel and plane, all the tools in his chest,—for these were developed out of the demands of the house. Even yet it had not done for him all that was possible, but would conduct him onward and upward so long as civilisation increased its demands upon the house and found its agent in the carpenter. A timber house could, perhaps, be made more interesting by art than any other house, and the artist was the carpenter. A timber house was quickly built, dried during construction, was damp-proof if properly put together, heat and cold resisting, and durable,—if properly protected from the worm and from fire. But for these enemies it would be perfect; indeed, till they got the mastery over it, it was perfect. But for fire and for careless construction and maintenance, we should now be in possession of a wooden domestic architecture, enriched with all the picturesqueness of the Mediæval period, developed with the changing taste and the growing wants of modern life, and made interesting by the art which the carpenter, beyond other artists, seemed to delight in exercising upon it. And in spite of fire and decay, a very large proportion of the houses in our old towns still consisted mainly of wood, the original fronts being only concealed by plaster or tiling. Though the outward exhibition of timber construction in towns was now practically forbidden, there was a great deal of scope for artistic carpentry in internal work; and in country places, where houses could be built on open sites and of moderate height, a timber house was often the best possible kind of building: it was comfortable, picturesque, popular. After briefly tracing some evidences of the early use of wood in building, and showing that many forms found in early stone buildings were directly copied from the forms of pre-existing wooden buildings, the lecturer mentioned a few examples of different kinds of houses made wholly or partly of wood. In the earliest times, before the invention of tools that would slit logs into thin slabs or boards, the log had to be used nearly round as it grows. Our own oak-trees were fixed upright in the ground close together, and when they could be cut with saw or adze the inner side was made flat and the edges close-fitted. The round side, with its bark, was put outside, forming a picturesque and warm-looking wall, as we might see at the ancient Church of Greenstead, near Epping, to this day. In countries where the fir or pine grew naturally the common practice was to lay the logs horizontally upon each other to form the walls, halving them together at the corners of the house, and making them fit upon each other more or less closely, according to the importance of the building. In Switzerland and in Sweden that mode of building had been developed to a very high degree, so that there were no more picturesque houses in Europe than those which were known as Swiss châlets or cottages, but which were sometimes important houses carefully and even sumptuously designed. Each district in Switzerland had its own distinct style of architecture, so that there was very great variety. Sometimes the houses were covered with very small thin pieces of wood cut to a pattern and overlapping like weather-tiling; and when a house of fir or pine had been exposed to the sun and weather for a century or more it put on a colour, varying from dark grey to reddish-brown, that was exceedingly agreeable. The ordinary "Swiss cottage" put up in this country was quite a different thing; and the fanciful cottages or lodges so abundantly used in connexion with French ornamental gardening were equally far removed from the original source of their inspiration. The very peculiar climate which we enjoyed was unfavourable for the use of such soft woods as fir or pine in external architecture. They might be used in very hot countries or in very cold countries, but not in a country where the weather was always changing, and where warm, moist days might be experienced at any time of the year. In the countries where these soft woods were used, there was a summer when they were well protected by being kept intensely hot and dry, and a winter during which they were equally preserved by the frost. But the great source of timber for building purposes in this country had always been the oak, which did not readily lend itself to the kind of construction seen in Switzerland. It supplied a large number of long and short curved pieces and of short straight pieces, but not many long straight pieces. It was therefore best utilised in framings where the long sills and heads were few, and where the posts and braces were numerous and of moderate length. Of construction of that kind, the old buildings in England, France, and Germany comprised a great variety of beautiful examples. The panels might be filled in with stone or brick, or might be lathed or wattled and plastered. There was, until lately, in Bishopsgate-street, a very fine example known as Sir Paul Pindar's house,* the front of which was now in the South Kensington Museum, and was being repaired, in order to be set up as an example of Mediæval London. Probably everybody thought that the panels were of plaster; but they turned out to be of oak, 3 in. thick, carved with projecting ornament, so that the whole design was carpenters' work. The lecturer next proceeded to speak of the interior decorative carpenters' work of old houses, referring especially to the panelling of walls of rooms fitted up in the sixteenth and seventeenth centuries. On the whole, he thought that the panel was the proper place for the best class of ornament, rather than the stiles and rails, although these should also be moderately ornamented, and that inlaying was the method most generally adapted to that purpose. After briefly noticing the woodwork of the houses of Saracenic and Mohammedan people, as well as that of India, which were capable of affording useful hints to us, the lecturer referred to the wooden architecture of China and Japan, from which he thought we could not learn much. It had been said that the Japanese carpenter did everything differently from the European carpenter. For instance, he drew his plane towards him when he was taking off a shaving, and he used his hand-saw on a similar principle. In both China and Japan the construction seemed to be very flimsy and unscientific. Great use was made of the bamboo, in ways that were very interesting to observe, but this could hardly be called carpentry. Slightness of construction, however, might have its advantages. Japan was one of those countries where earthquakes were common. A building which was constructed of slight, flexible materials, very firmly bound together at the junctions of the different parts, would yield to an earthquake shock, and be uninjured by it. But there was another mode of construction in common use with the same object. The Indian builder would construct the walls of his house by setting up a double framework,—one frame being flush with the outer face of his external wall and the other frame being set up inside it flush with the inner face, the timbers being about 4 in. square, and a space of about 2 ft. being left between the two frames. It was like a mason's scaffold, and several short pieces like putlogs were run across and secured with pegs to the two frames, their ends showing both inside and outside. When he had constructed the ground-story he filled in solidly with brickwork the whole space occupied by the two frames, and the distance that separated them, so that it was beyond the power of earthquakes to shake down a structure so firmly tied together. That form of construction would perhaps be suitable for use in New Zealand, where shocks of earthquake, generally slight, were so constantly occurring that they were hardly a matter for observation. The student of old work and of materials used in carpentry would see that timber architecture differed materially from architecture in stone. It was not an architecture of column and entablature and arch and corbel, but of post and beam and flat ceiling and far-projecting bracket. Timber adapted itself to such features externally as verandahs, projecting windows, covered balconies, and dormers. In European timber-architecture the angle-post was one of the finest features. Rising from its stone base, it curved out boldly to support the overhanging corner of the story above, and was often richly panelled or carved with foliage, or even with some statue or group of figures. Many interesting examples were illustrated in Mr. Corder's recent book on the angle-posts of Ipswich.* Referring to modern work, the lecturer said that a good deal of what was called "half-timber" building had been done in this country without much attempt to advance the art beyond that which we saw in the old examples. Although many country houses had been built in that manner, some being of considerable size and very carefully constructed, none seemed to equal the best old buildings in the richness and the interest of their ornamentation. In America, from necessity or from choice, the construction of wooden houses might be said to be a living art. The great obstacle to the use of good ornament in woodwork in situations to which it was adapted was its cost. As a rule our carved work was too much elaborated and too much polished up. The good old carving was generally cut out boldly and quickly, and left somewhat in the rough. The work was such as any one accustomed to the use of chisel and gouge and mallet could execute without special training of the hand. He would only need to study old examples and natural objects, and to possess some fancy or imagination of his own, to enable him to make his work interesting as well as decorative. It was only in the very highest kind of work that great delicacy of finish was desirable,—work executed in the finest materials to be placed near the eye in buildings meant for very important uses. All ordinary work was quite within the reach of the carpenter who had taken some pains to qualify himself for it, and the best work, most exquisitely finished, was not beyond his reach. To put the matter plainly, he ventured to say that the least-educated person in that hall was probably better educated than any of the men who designed and executed the beautiful old woodwork in the buildings of the past. As a rule those men must have been either master carpenters or ordinary workmen paid by the day. If the work was done by contractors having more than one building in hand at one time, it is highly probable that those men were too much engaged in their business arrangements to do more than guarantee that the design should be appropriate to the purpose. Village journeymen carpenters must have done the rest. The earlier part of the seventeenth century

* For brief reports of the previous lectures see pp. 151, 174, 231, *ante*

* This house, which was latterly a tavern called "The Paul Pindar," was illustrated in the *Builder* for Oct. 11, last.

* "The Old Corner-Posts of Ipswich." By John S. Corder. Ipswich: S. H. Cowell, 1890. Reviewed, and two or three illustrations reproduced, in the *Builder* for Oct. 18, last, pp. 310, 312.

was a time when an immense quantity of good timber houses were being constructed. In 1632 a contract was made by John Abell, carpenter, who was credited with a great deal of that kind of work. He lived in a very secluded village in Herefordshire, and could not have had much of a workshop. He contracted with Viscount Scudamore to cover the ruined church of Abbeydore with roofs "sufficient, stronge, and hansome," and "firmely and decentlie" framed. That was perhaps the first recorded instance of a church restoration. He began by cutting down trees upon the estate for his ladders, windlasses, and other engines and went on to fell other timber with which to make his roofs, the contracted price of 110*l.* being paid to him in instalments, as it might be now. Upon his tombstone he was styled "architector," a fine name then in use by master workmen who designed as well as built. There was some probability that the old Town-hall at Leominster was one of his works. The modern practice would be to call in an architect, from whose drawings everything would have to be done, with the result in general that such houses as were built by John Abell and his contemporaries could hardly be produced now. The stiffness and poverty of the pencil lines drawn to scale and by square were reproduced in the building, and the carving that gave life to the old designs was too expensive for general use. The lecturer said he had known cases in which the builder had gone to great trouble in order to find clean, straight oak timber to suit the design as it was drawn out, although if the timber, had been used crooked and crabbed as it was found, the effect would have been more characteristic and interesting. The carpenter who had to work with the architect should know something of detail and ornament as the architect knew it, and not merely the rules of construction. The architect should know more about practical carpentry, and, though he might be the designer of the whole, should feel able to leave more of the detail, which would give character and interest to the building, to the taste and skill of the man who had to carry it out. As an aid to that end, the Carpenters' Company was to be warmly commended for the establishment of its classes for wood-carving, and for its other efforts in the promotion of technical education—efforts to which they all wished success.

PROFESSOR BANISTER FLETCHER ON "ARCHITECTURE AND ITS CIVIC AND COMMERCIAL VALUE."

The sixth and last lecture of the series was delivered on Wednesday, the 18th inst., Sir John Lubbock in the chair. Architecture, said the lecturer, had a definite object over and above that of giving pleasure. She had to serve the needs of man, and was therefore a useful art as well as a fine art. She, therefore, recognised utility as the basis of her work, on which she erected a superstructure of her own with grace of proportion and beauty of ornament. Without such additions, utility alone would give us, not architecture, but only building. Having illustrated this point by means of drawings of some well-known public buildings (such as Greenwich Hospital) as they are and as they would appear if reduced to mere building, he proceeded to argue that the difference of cost between an architectural and a merely utilitarian building need be little or nothing; but even if it cost more, architecture, he contended, had its civic value, inasmuch as through its agency the citizen gained (1) the enjoyment of the beautiful; (2) the use of widened and ennobled thoroughfares; and (3) brighter surroundings. In conclusion, the lecturer spoke of the commercial value of architecture, which, he said, was certainly the lowest ground on which he could base its claims, although he feared it was the one most likely to command attention in the present age, when we continually heard the question, "Will it pay?" He ventured to answer that question by a very old example. What is now known as Belgravia was formerly called "The Five Fields." The land was deemed to be of little value, and lay so low and so near the river as to be called "marshy." How did Cubitt, the great builder, do with that land when it came into his possession,—by building small houses, as many would have done, considering such houses best adapted to so unpromising a site? No; he adopted quite a different treatment of the land. He made the land of great value by putting thereon palatial residences,—as they were considered at the time,—and thus caused land which was comparatively worthless to acquire great value. A more recent instance was afforded by Hankey's residences, Westminster (ugly though they were). Another still more recent illustration was afforded by the Westminster Town-hall and the residential flats near it, which were built on the site of what was, not so very many years ago, almost the lowest slum of London. By the expenditure of large sums of money in architectural work the ground value of the land had been raised enormously. Similar results had followed similar procedure in the provincial towns. Tradesmen and others testified that they found it to their advantage, from a business point of view, to carry on their trade in premises which were architecturally inviting and attractive.

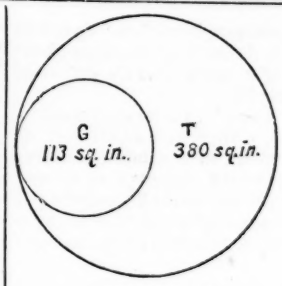

Fig. 1.

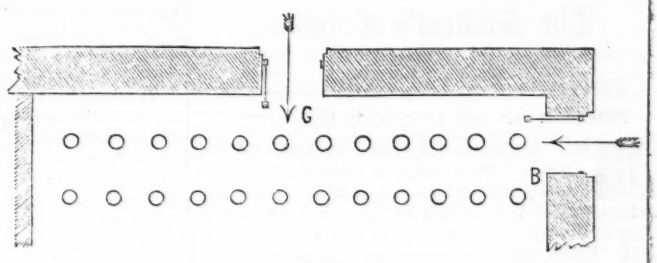

Fig. 2.

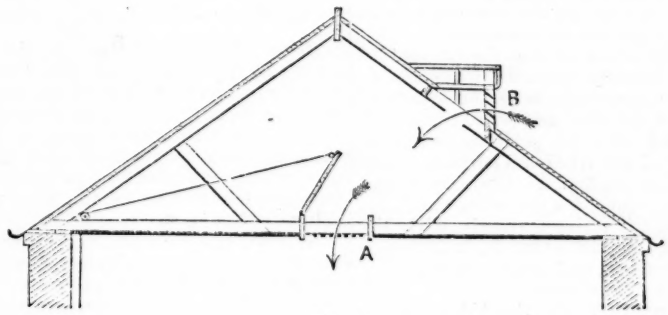

Fig. 3.

Correspondence.

To the Editor of THE BUILDER.

THE SANITARY CONDITION OF SCHOOLS.

SIR,—On page 215, "Sanitas" asks me to give a short explanation of my objections to the arrangements at present adopted by the Glasgow School Board for the ventilation of the schools along with my suggestions as to improving same.

My objections to the present condition of these Board Schools are that they are, generally speaking, exceedingly deficient in means for keeping the atmosphere of the rooms pure, healthy, and comfortable for either the pupils or their teachers. In many of the school-rooms there is no proper provision for an adequate supply of fresh air, and especially not for an adequate supply of warm fresh air in winter. And in this respect the West-end schools are, perhaps, the worst. One would have supposed that the new high school when it came west would have been a model, but in the rooms I was in it has not got beyond glass hoppers in the windows for some, and in others nothing. There were some large vertical iron gratings in the walls, which I was going to give credit for as being inlets, but I was at once told "Not so; those are merely the remnants of a former style of heating, and the flues are built up."

Then as to the outlets at the ceiling, where there are such, these belong to the Lilliputian order, nothing Brobdingnagian in this respect in our Board—in some cases one diminutive outlet-grating, about 10 in. by 5 in., for a roomful of seventy, in other cases two such. In another West-end school for a large room holding about 110 pupils, and with three teachers in it, the outlet was only one small 12-in. diameter pipe, as at G, fig. 1, giving only one square inch of outlet for each individual, whereas in a Selkirkshire school with a room in it also for 110 pupils, the size of its main outlet-pipe is 22 in. diameter, as at T fig. 1. Instead of the Glasgow school having less than a third of what the country school has, it should have considerably more. In the ground flat of the same school, however, the case is worse still, as these rooms have no outlet-pipes at all.

The windows are hung like doors, as in fig. 2, and when I looked in, the window in one room was open, as at B, letting in the outer air on the left sides of the boys, while in another room the window was open as at G, letting the air in on the backs of the girls.

At another three-flatted very large school the air of the infants' room, holding about 150, was simply disgusting. The ventilating provision is so meagre and bad I was glad to get out of this room, it felt as bad as a midden. All the rooms in the two lower flats felt musty and disagreeable. In my opinion both scholars and teachers are being slowly poisoned in these schools.

At another school the provision for outlet ventilation is as in fig. 3, so that the intended outlet A is often a disagreeable inlet. The teachers told me: "We are never free of colds here," and one young lady remarked: "I am just newly back from being a month off with rheumatic fever."

In a number of the three-flatted schools the same wind-acting ventilator on the roof that serves for one or more top flat rooms also, has pipes joined into it from the rooms in lower flats, with the result that the ventilator may get its principal supply from the top room close to it and take very little away from the lower rooms far away from it, and more especially when, as I have seen it, the pipe from the top rooms was the *largest!* In one test I made, the speed of the outgoing air from the lowest room was only about one-tenth of that from the top room.

The Board seems to have had no proper understanding or appreciation whatever of the necessities of the case, or of the interests involved; but in its long seventeen years' grand opportunity for progressive work, it has in great part been moving in a circle, even the newest schools opened last year affording admirable examples of "How not to do it."

The Board imagined it could do better than its architects, but what has its enthronement of incapacity and monopoly come to? As a sanitary engineer I could not conscientiously point to even one of its schools as hygienically passable. Many landlords in Glasgow have had to pay damages to their tenants for letting them unhealthy houses. I expect shortly to see parents suing our School Boards for injuring their children by the unsanitary condition of the schools the children are forced to attend.

Instead of really saving the money of the public by the bad way in which things have been done, the Board has been actually wasting it. A new Board is now being elected, and it is to be hoped it will rectify matters as soon as possible,—during the summer vacation at latest, of its own accord, and without compulsion.

In my opinion, the present automatic system in vogue is a miserable failure, and these large Glasgow schools cannot be properly ventilated without mechanical power, and in this opinion I am at one with the late Professor Carnelley.

W. P. BUCHAN.

SKY-SIGNS.

SIR,—I trust that the suggestion made by you on page 224 of last week's *Builder* will be acted upon, and that frequent painting or other protection will be exacted from the possessors of sky-signs. They demand special care,—something quite beyond the care devoted to ordinary buildings. The repairs and painting should be done just before the new certificate is required, and the surveyor should have notice that the work is going on, and thus see exactly how things stand. Workmen used to such feats would test the swinging letters, the guys, and bolts, as directed. An inspection at a time when repairs were not going on would be a different process,—the discovery of obvious defects might then be the limit.

AN OBSERVER.

COMPTON WYNYATES.

SIR,—Mr. Rimmer's valuable drawings would be still more valuable if the points of the compass were shown on the plan. He speaks in his description of the chapel as being on the left on entering the court. Perhaps he will explain, through your columns, how the house does lie.

N. S. W. EAST.

THE LABOUR COMMISSION.—In the House of Commons, on Tuesday, Mr. W. H. Smith, in answer to Mr. Howell and Mr. John Ellis, said:—It is not, I think, desirable that I should give the terms of reference without giving at the same time the names of the Commissioners, and this last information is not yet complete, owing to the delay which has taken place in answering the invitation of the Government to serve on the Commission. I hope, however, that the Commission will be completed in the course of a day or two.

The Student's Column.

VENTILATION AND WARMING.—XII.

FRICTION OF AIR IN DUCTS AND FLUES.

THE question of the friction of air against the sides of ducts and flues is one that has received considerable attention at the hands of physical inquirers. The difficulties of the subject are considerable, and have been approached from different points of view; hence we now have a number of formulæ of varying appearance, but, in general, taking account of the same factors in the problem, to a greater or less extent.

It is generally admitted that the amount of friction varies directly—that is, increases or decreases in the same ratio, with the square of the velocity, and also similarly with the length of the duct and with its periphery—that is, with the extent of the frictional surface, which is, of course, the product of the length and periphery of the duct. On the other hand, the amount of friction varies inversely with the sectional area of the duct—that is, it decreases as the area increases, and increases with the decrease of the sectional area.

As long ago as 1847 Mr. Hawksley, at the Institution of Civil Engineers, quoted a formula for the ventilation of mines by means of a difference of temperature in down-cast and up-cast shafts, which takes account of the frictional loss we have above mentioned. The formula referred to is $v = 96 \sqrt{\frac{T - t}{T + 448} \cdot \frac{D\,s}{m\,l + 368\,s}}$

where t = temperature of the air in the down-cast shaft, T = temperature of the air in the up-cast shaft, D = depth of shaft in feet, m = periphery of transverse section of air-course in feet, s = area of section in feet, l = length traversed by current in feet, v = velocity of current in feet per second.

In 1871 the same authority quoted the following formula for the velocity of moving air in a circular pipe: $v = 1{,}368 \sqrt{\frac{h\,d}{l}}$, where h = pressure of head, d = diameter, and l length of pipe.

Box gives us for a calculation of the head due to friction alone the expression $H = \frac{C^2\,L}{(3{\cdot}7\,d)^5}$

where d = diameter of the pipe in inches, L = length of pipe in yards, C = cubic feet per minute, and H = the head (or difference of pressure at the two ends of the pipe) in inches of water.

We have not hitherto used the term "head" in these papers, as, without explanation, it might cause misapprehension in the minds of some students. The term "head" is very generally and somewhat loosely used in speaking of hydraulics and pneumatics. In its original and proper significance, "head" is the vertical height of the horizon or topmost level of a fluid above the point to which the "head" is measured. From the "head" can be obtained at once the theoretical velocity of movement *in vacuo* at any point of a particle of fluid from what is called the rule of Montgolfier, which is $v = \sqrt{2gH}$, g being the acceleration of velocity in each second of time, viz., 32·18 ft., and H, the "head," or height of descent. This H is also called, and perhaps more properly, the "velocity head," or "head of velocity." In Chapter VIII. we have used the expression, "column of velocity," to denote that which we are now considering as "velocity head." Inasmuch as velocity may be communicated to, or induced in, a particle by pressure or force applied at a point instead of by gravitation, it has become the practice to speak of this pressure or force as "head," when dealing with fluids, mainly because such pressure or force can be expressed in terms of a column of a standard fluid such as water or mercury, the energy of which depends upon its height or "head." Hence we hear of "frictional head," by which is meant the pressure or force necessary to enable a body of fluid to overcome the resistance of friction in a pipe or duct, and which can be represented by the weight of a column of a certain number of inches of water or mercury. So too we have "entry head" to denote the amount of effective force lost by passing through an opening under various conditions, examples of which were given in our last chapter. Again we have the specialised terms "pressure head" or "dynamic head" which latter is defined by Rankine thus: *The dynamic head of a particle is its potential energy per unit of weight.*

The amount of "head" can be expressed in terms of the height, either in inches, feet, or other lineal measurement, of a column of water or mercury,—the standard liquids,—or of any other liquids; and also in terms of weight per unit of base, or of atmospheres, that is, of a column of air, so many times that of the normal atmosphere.

Rankine gives the following formula for the amount of the friction on a given surface, S, in an air duct:—$R = f\,\rho\,S\,\frac{v^2}{2g}$, where S is the surface of contact, that is, the product of length and periphery of the duct, v = the velocity, ρ = the weight of an unit of volume of the fluid, and f = the co-efficient of friction which, for air and other gases, is 0·006 nearly. This expression, it will be seen, takes account of, not only the velocity and frictional surface, but also the weight of the fluid per unit of volume; that is, the specific weight.

Now the specific weight of air varies with its density, and the density varies with the temperature and with the pressure. With a perfect gas flowing in a duct, in which no loss of temperature occurred through conduction, a certain amount of heat would be generated by the friction and this would cause the expansion of the gas, and hence an increase of velocity, so that the velocity lost by the friction would be regained by the increased expansion caused by the heat developed by that friction.

Since, however, these conditions do not positively exist in any actual case of the transmission of ordinary atmospheric air through any ducts that can be practically constructed, and since the temperature of the air has an immediate and positive effect upon its density the specific weight of air in its influence upon friction may be taken into account by a consideration of its temperature. This has accordingly been done by Fischer in the somewhat elaborate-looking formula which he has proposed for the friction of fluids. This formula is $p = \varkappa \left(\frac{1}{v} + 20\right) \frac{\gamma_0}{1 + a\,t} \cdot \frac{l\,u}{q} \cdot \frac{v^2}{2g}$ where p = the loss of pressure (or head) in kilograms, equivalent to the weight lost in a head one square mètre in sectional area; γ_0 = the weight of 1 cubic mètre of the fluid in kilograms reduced to the standard temperature of 0° centigrade; t = the actual temperature of the fluid; a = the co-efficient of expansion for each degree for the particular fluid; l = the length of the duct or pipe in mètres; q = its sectional area in square mètres; u = its periphery in mètres; v = the velocity per second in mètres; g = 9·81 mètres, and $\varkappa$ = an empirical co-efficient dependent upon the fluid and the nature of the frictional surface.

This formula by the factor $\frac{\gamma_0}{1 + a\,t}$ takes account of the weight of the fluid, and can accordingly be used for compressed air, or for heated air as for any other fluids.

In dealing with compressed air, it is, however, important to remember that in any long channel, with compressed air passing through, the same velocity may be observed at both ends, but with varying amount of compression, for if the compression of the air diminishes, its bulk increases, and the velocity is so maintained; thus, we may have no loss of velocity, but a loss of pressure, due to the absorption of energy by friction. If the compression is the same at both ends of the duct, the velocity will have been affected by the friction, but in practice this would seldom occur.

The value of the empirical co-efficient $\varkappa$ in the above formula has been found by experiment to be 0·0003 for air in smooth circular pipes, and from 0·0004 to 0·0007 for ducts of brickwork or masonry, according to the smoothness or otherwise of the periphery.

A simpler expression derived from this formula gives us a value for the co-efficient of loss of head C, corresponding to the similar factor as given for various cases in the last chapter; thus $C = \frac{K\,U\,L}{4\,S}$ where U = the periphery, L = the length, S = sectional area, and K = a co-efficient varying with the $\varkappa$ in our last formula. This holds good for ducts of any form, but may be still further simplified for square or circular ducts, where the periphery and sectional area are, of course, equally dependent upon the diameter. Hence we now have $C = \frac{K\,L}{D}$ where D = the diameter of square or circular ducts.

The value of K is thus obtained:—$K = 4\varkappa \left(\frac{I}{v} + 20\right)$; that is 4 times the first factor in the formula above. $\varkappa$ has the values mentioned above, *i.e.*, 0·0004 to 0·0007 for atmospheric air in built channels, and v = the velocity of air current.

GENERAL BUILDING NEWS.

ADDITIONS TO THE ROMAN CATHOLIC CATHEDRAL, EDINBURGH.—This church consists of a nave without aisles, having accommodation for about 1,000 persons. At one side there was a chapel, recently destroyed by fire, with a vestry behind it. These are to be dispensed with, and aisles are to be formed on either side, which will, of course, necessitate the removal of the present side walls, and the roof will then be supported by arcades in the usual manner. In rear of the cathedral, there is a priest's house, the site of which, it is contemplated, may be used for a future extension. The plans, which were prepared by Mr. John Biggar, architect, show two towers flanking the façade towards Broughton-street, which may be erected when funds are available. The original building was designed by the late Mr. Gillespie Graham, and is in the Perpendicular Style. It was erected in 1813 at a cost of 8,000*l.*, and measures 110 ft. by 57 ft. The new aisles will accommodate about 1,000 persons. Operations are to be commenced at once, and it is expected that the work will be completed before the commencement of next winter.

EXTENSION OF THE WARNEFORD HOSPITAL, LEAMINGTON.—On the 18th inst., Lord Leigh laid, with Masonic honours, the foundation-stone of a new wing of the Warneford Hospital. The Committee recently purchased from the Dowager Countess of Aylesford an acre of land on the east side of the hospital, at a cost of 1,000*l.*, and Mr. Keith D. Young, of London, prepared the plans of the new buildings, which include two wards for in-patients, with fourteen beds each, and an operating theatre and surgeons' rooms on the ground floor. There will also be extensions to the nurses' home, a new sanitary block for the children's ward, and a women's accident ward. The new wards will be built upon the "pavilion" system, in order that a second block may be added when sufficient money is provided. The Committee accepted the tender of Mr. J. S. Kimberley, of Banbury, amounting to 13,180*l.*

ALTERATIONS TO SALISBURY INFIRMARY.—The tender of Mr. C. A. Hayes, of Bristol, for 4,837*l.*, has just been accepted by the committee of the Salisbury Infirmary, for the alterations to the building. The greater portion of the additions is between the children's ward and the accident and Bartlett wards; it is of three stories in height, of fireproof construction, and reached by a stone staircase to all floors, which also connects the children's ward. An entrance-lobby, waiting-room, clerk's office, lavatories, &c., are the alterations to be made on the ground-floor. On the first floor the building contains the accident side ward, bath-room, scullery, lavatory, and offices; on the second floor, another ward, with attendant nurse's sitting-room and bedroom, scullery, and necessary offices, and, disconnected from this, the bath-room, lavatory, scullery, and offices of the Bartlett ward. The wards are to be covered with oak boards, and the corridors and offices are to be of tiles, both laid upon fireproof floors. The walls of the corridors and offices where new, are to be lined with glazed bricks. The exterior of the building is a plain Renaissance treatment, executed in Doulting stone. In addition to this, the Bartlett and accident wards are to be laid with oak, upon floors of fireproof construction; iron-roofed balconies are to be provided to each ward, with French casements leading to both of them. A new lift is to be provided, and a side ward floored and fitted up as a reception ward for accidents. Better ventilation, and a new system of heating for the added portion of the Infirmary are also included in the work to be done. The architects are Messrs. John Harding & Son, Salisbury.

NEW CHAPEL, WALKLEY.—The new chapel which has been erected by the Primitive Methodists in South-road Walkley, near Sheffield, was formally opened on the 22nd inst. The front elevation of the building is towards South-road. Internally, galleries have been erected on all four sides, that behind the pulpit being appropiated for the choir. Both galleries and floor are benched in pitch pine, 500 sittings being provided, and the floor is sloped upwards towards the rear of the chapel. The front of the gallery is broken up by panelling, while the windows on three sides are glazed with figured glass, bordered with ruby and amber. The chapel is heated by a combination of hot air and hot water. The main entrance doors open into a lobby from which there are two entrances to the area of the chapel, and stairways on each side to the galleries. At the back are a minister's vestry and two class-rooms, and sufficient land has been reserved for the erection of schoolrooms when that becomes possible.

The contractors for the erection of the chapel are Messrs. Atkinson, Row, & Petfield, of Sheffield. The masonry has been done by Mr. W. May, and the heating apparatus has been furnished by Messrs. Wright Brothers, Attercliffe.

FISH AND VEGETABLE MARKET, DUBLIN.—The foundations for a new fish and vegetable market are being laid on the site for the building between East Arran-street and Fisher's-lane, Dublin. The contractors are Messrs. Thomas Connolly & Co. The market will form a parallelogram 330 ft. long and 295 ft. broad. The design has been supplied by Mr. Harty, the Borough Engineer. There will be six entrances, and the passages leading through the market will be broad. The front will be of coloured bricks, with ornamental dressings. The ironwork has been contracted for by Mr. Lysaght.

ROMAN CATHOLIC SCHOOL AT LOANHEAD, EDINBURGH.—On the 17th inst. Archbishop Smith laid the foundation-stone of a Catholic school at Loanhead. Mr. Rhoderic Cameron, of Edinburgh, prepared the plans for the work, the cost of which is estimated at about 1,000*l*. The main building will be T-shaped, and consist of a school-room, class-room, and infants' gallery, with cloak-rooms, &c. Accommodation is to be provided by it for about 230 pupils, and the rooms will be capable of conversion into a hall to seat 450 people. The building is to be chiefly stone, found in the district.

SCHOOLS: LLANELLY.—On the 16th inst. the higher grade schools, Llanelly, which face the People's Park, were thrown open for the reception of scholars. The schools cover an acre of ground, and will accommodate 322 girls and 322 boys, and the cost of construction has been 4,350*l*. The building is Gothic in style and has a frontage of 120 ft., and is 50 ft. high to the ridge, with an additional 20 ft. to the top of the central turret, which ventilates all the class-rooms by means of wooden shafts. The external walls are of local stone, with Bath stone dressings. The architect is Mr. E. H. Lingen-Barker, of Hereford. The contractors were Messrs. Brown, Thomas, and John, and the School Board clerk of the works, Mr. W. Morgan.

NEW REREDOS, ST. MATTHEW'S CHURCH, SHEFFIELD.—A new reredos has just been erected in the Church of St. Matthew, Sheffield. The base of the reredos is of alabaster, and supports two gradines also of alabaster. On this is the reredos proper, which consists of an oil-painting by Westlake representing the adoration of the shepherds, in a large and carved gilt frame. The work has been carried out in Sheffield by Mr. Frank Tory, from designs by Mr. J. D. Sedding, of London, and has cost about 270*l*.

ADDITIONS TO GORGIE PUBLIC SCHOOL, EDINBURGH.—This school, which has received extensive additions during the past twelve months, and belongs to the St. Cuthbert's and Dean School Board, was opened on the 16th inst. The building was previously only one story, but now another flat has been added to it, and the wings of the structure have also been extended, accommodation being provided for 1,094 children. The cost of the additions has been about 7,300*l*. Mr. Robert Wilson, Edinburgh, was the architect.

NEW FREE CHURCH AT ABBEYHILL, NEAR EDINBURGH.—On the 21st inst., the ceremony of laying the memorial stone of the Smith Memorial Church in course of erection at Parson's Green, Abbeyhill, was performed by Mr. Charles J. Guthrie. The church, which occupies a site at the corner of the Portobello-road and the Willowbrae-road, Piershill, is to be in the decorated Gothic style of architecture, with a square battlemented tower at the north-east corner, reaching to a height of about 80 ft., and a slated spire, 40 ft. higher, rising out of the tower. Internally the edifice will be about 90 ft. long and 40 ft. wide, being seated for about 500 persons. Underneath the church will be a hall, together with a session-house, ladies' room, lavatories, and heating chamber. The building will be constructed of Corncockle stone, and is expected to cost about 5,000*l*. Mr. Sydney Mitchell, of Edinburgh, is the architect of the building.

RE-OPENING OF BONHILL FREE CHURCH, DUMBARTON.—This building, which during the past twelve months has been undergoing various additions and alterations, was reopened on the 22nd inst. The present alteration included the taking down of the side walls of the central part and making the interior of the building about 68 ft. long by 55 ft. wide. The old plaster roof has been removed, and instead, there is an open timber roof. The accommodation has been increased by about one-third, and the building is now seated for about 700. A new staircase for the gallery at the end is erected, and a new hall, under which is the heating chamber and cellarage. The cost of the present alterations is about 1,800*l*. The alterations have been carried out from designs by Messrs. Campbell Douglas & Morrison, of Glasgow.

STAINED GLASS AND DECORATION.

NEW WINDOW, WORLE CHURCH, SOMERSET.—A window has just been placed in the east end of the chancel of Worle Church by the Rev. W. F. Rose, M.A., the artists being Messrs. Clayton & Bell, London. The scenes depicted are the eight principal events at the close of our Lord's ministry.

MEMORIAL WINDOW, ST. JOHN'S CHURCH, ALDERCAR.—A stained glass window dedicated to the memory of the late Rev. James Hawkins, M.A., has been placed in the east end of St. John's Church, Aldercar, Derbyshire. The three centre lights bear the figure of Peter, James, and John, while the remaining portions are filled up with tracery work. The work of staining has been entrusted to Messrs. Dunne Bros., of Birmingham, while the fixing has been in the hands of Mr. Ball, Long Eaton.

DECORATION OF THE CHURCH OF ST. JOSEPH, DUBLIN.—The Church of St. Joseph, Berkeley-street, has recently undergone internal decoration. Surrounding the altar a series of sacred representations are painted in niches, with mosaic gold background. The walls of the church have been painted in oils in tint of Caen stone colour, with dado borders, and window splay decorations. The spandrels between the arches in the nave have in the centre of each spandrel a medallion bearing the figure of an Irish bishop's mitre and crozier on gold ground, surrounded by conventional and symbolic scroll-work in colours. The ceilings of the transepts have been painted in cobalt, and powdered in gold and white stars. This work has been designed and executed by Mr. R. Mannix, of Dublin. A carved pulpit, with canopy in Riga oak, has been erected from designs by Mr. G. Ashlin, and executed by Messrs. Beaky.

STAINED WINDOW, ST. THOMAS'S CHURCH, STOURBRIDGE.—In the chancel of St. Thomas's Church, Stourbridge, a stained-glass window has been erected by Mr. Charles W. Collis, in memory of his wife. The window, which is the centre one in the chancel, is 16 ft. high by over 8 ft. wide. The subject illustrated is "The Ascension," the figures being very nearly life-size. The work has been carried out by Mr. Samuel Evans, of West Smethwick.

MEMORIAL WINDOW, ULGHAM CHURCH.—A window in memory of the late Canon Grey has been erected in Ulgham Church, Northumberland, by the parishioners. The subject is our Lord's charge to St. Peter. The ornamental detail of the window is composed of early Grisaille work. The window has been designed and executed by Mr. G. J. Baguley, of Newcastle.

FOREIGN AND COLONIAL.

FRANCE.—The prize entitled "de reconnaisance," founded at the Ecole des Beaux-Arts by American architects, has been awarded this year to M. Chausemiche, pupil of MM. André & Laloux. The Muller-Salinée prize, for the student who has gained the highest marks in the architectural course of instruction at the Ecole, has been given to M. Delabarre, pupil of MM. André & Moyaux. ——M. Poilpot has just completed a panorama of the coronation of the Emperor of Russia, which is intended for the Moscow Exhibition. ——The monument to Victor Noir, by M. Lalou, which was in the Champ de Mars Salon last year, is shortly to be set up in the Cemetery of Père Lachaise.——On the occasion of the last fine art exhibition at Munich, the Bavarian Government bestowed the Order of Merit of St. Michael on the painters Cazin, Courtois, Roll, Carrière, and Binet. ——The intended enlargement of the offices of the Bank of France will necessitate the destruction of a curious relic of old Paris, the house, No. 48, Rue de Valois. The house, which crosses the Radziwill passage, is the highest in Paris, having nine stories approached by an oddly-constructed staircase of double curvature.——M. Chéret, well known as a designer of decorative placards, has been appointed curator of the Musée Grévin in place of M. Grévin, the caricaturist, who has retired on account of ill-health.——M. Decauville, the founder, has just finished the casting in bronze of the national monument commissioned from M. Carrièr-Belleuse by the Government of Costa Rica. The monument includes seven figures over life size. It will be exhibited at the next Salon.——At the Académie de Beaux-Arts three painters, MM. Jean Paul Laurens, Jules Lefebvre, and Edouard Detaille, are candidates for the place vacant by the death of Meissonier. The election will be made in a few days.——The jury of the Salon has been constituted, consisting of twenty titular jurists and twenty supplementary ones. Among the first are MM. Roll Cazin and Mathey; among the latter MM. Duez, Besnard, Le Blant, and E. Lambert, who are all concerned also in the New Salon. ——Two fine tapestries are on exhibition at Versailles. They are after the design of Lebrun, and were found recently in an old château in Brittany.——There is a proposal to establish a railway line between Havre and Pont-Andemer, to be carried under the Seine in a tunnel, as the bed of the river in that neighbourhood is very unfavourable for building a viaduct.——The death is announced of M. Hoschedé, an art-critic and one of the founders of the *Gazette des Beaux-Arts*. The death is also announced of M. Berthelet, architect, of Lyons, at the age of 73.——At Langres (Haute Marne) a retrospective fine-art exhibition is to be opened on August 13, to remain open for a month.——There has been a competition at St. Brieue (Côtes du Nord) for the best scheme for water supply. The first premium has been given to M. Mousso, engineer of St. Brieue.——The Minister of Public Works has appointed the following architects,—M. Joly and M. Bouvard, M. Marcel Lambert and M. Paulin—as Inspecteurs-généraux des Bâtiments Civils.——The second competition for the decoration of the Galérie Lobau at the Paris Hôtel de Ville is to be shortly decided. The competitors are MM. Bourreau, D'Espouy, Dubufe, Picard, and Risler.

BERLIN.—The foundation-stone to the proposed Memorial Church to the deceased Emperor William I. was laid by the Emperor and Empress on Sunday last, in presence of the Ministers, Generals, and all Court, State, and Municipal dignitaries present in the city, cannons thundering during the ceremony. The design of the building is by Herr Baurath Schwechten, and was selected in a limited competition.—Last week a celebration in memory of the deceased Vienna architects, Friederich von Schmidt and Th. von Hansen took place under the auspices of the "Vereinigung Berliner Architekten." The address in memory of Schmidt was spoken by Herr Fritsch (editor of the *Deutsche Bauzeitung*), and Baurath Ende made the memorial speech to Hansen.—An exhibition of the drawings of Von Schmidt has been opened at the Royal Technical College.—On Monday, the 16th, Herr Oberbaurath F. Adler read a paper at the "Architekten Verein" on the Olympian discoveries. The Professor in illustrating his lecture made use of some proof-sheets of the lithographs intended for the important publication on "Olympia," about to be brought out by the Government under the direction of Professors Curtius and Adler.—Regierungs Baumeister Jaffér (of the Ministry of Public Works), Germany's official delegate at the last Melbourne Exhibition, has been elected to look after Germany's interest at the coming London German Exhibition.

NORWAY.—A new Norwegian Minister of Public Works has been elected, Herr Theodore Nysom, in recent years President of the Polytechnical Association of Christiania, and an engineer of high standing.——The Norwegian Association of Engineers and Architects has adopted a resolution demanding from the authorities a closer supervision of building work.——In consequence of the great number of applicants for places, the public technical college at Christiania is to be enlarged at a cost of 1,600*l*.

SWEDEN.—At the last meeting of the Building Association of Stockholm the subject under discussion was "On Control over the Erection of Private Houses," and it was decided to appoint a committee for framing detailed regulations for the exercise of such control, which are to be discussed at the next meeting.——A curious action has been commenced in Stockholm, the relatives of a well-known engineer, Herr Brunius, who was suffocated by coal-fumes whilst engaged in the new mansion of Herr F. Bünsow, claiming 2,800*l*. compensation in respect of his death. The defendant denies being responsible for the occurrence.——The port of Ystad, in southern Sweden, is to be considerably enlarged and improved.——A new Town-hall has been completed in the town of Kristianstad, at a cost of 5 000*l*., exclusive of site, &c. The style is Dutch Renaissance, the architect being the late Herr Isæus.——The Industrial Credit Company is building new bank offices in Stockholm, the architect being Herr Erik Josephson. The building is in the Gothic style.——At a recent meeting of the Swedish Tourist Association, Prof. Hildebrand, the well-known antiquarian, drew attention to the great architectural interest attaching to the old churches in the lonely island of Gothland, in the Baltic, and their number. During a journey of 260 miles he had found no less than fifty-five ancient churches. They all date from the Early Gothic period. They are built of the excellent sand-stone and lime-stone found in the island.——It is intended to acquire the remarkable altars in the ancient Cathedral of Upsala for the archæological church to be built by the Northern Antiquarian Museum in Stockholm.——Prof. Julius Kronberg, the artist, has succeeded in putting together, with great skill, the portions of Gobelin tapestries recently discovered in the old royal castle, and they have been hung in the Palace at Stockholm. They represent scenes from the Psyche myth. Professor Kronberg is at present engaged in painting a series of large frescoes on the grand staircase of the Royal Palace.

THE GATES AND BARS IN ST. PANCRAS.—It will be remembered that last year an Act of Parliament was passed authorising the County Council of London to arrange for the removal, upon certain conditions, of the gates now existing in several streets in the parish of St. Pancras. Those conditions having now been fulfilled, the Clerk of the Council has issued a formal notice addressed to the Duke of Bedford, ordering his Grace, as the ground landlord of this portion of St. Pancras, to take down and remove these obstructions within three months from the present date, and to repair the footway and roadway on which they stand, "together with any sheds, fences, rails, or posts, or other erections." The gates and bars specified in this notice are those across Upper Woburn-place, Gordon-street, and Torrington-place; and a similar notice has been issued to a Mr. Alfred Henry Harrison, ordering him in like manner to remove the gate and bar on his property which runs across Sidmouth-street, near Gray's Inn-road and King's Cross.—*Times.*

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised	Premium.	Designs to be delivered.
Ornamental Iron Bridge	Darlington Corp.	Not stated	April 15
*Public Hall and Offices, Earlestown	Newton-in-Mackerfield Commissioners	50*l.* 25*l.* and 15*l.*	May 14
*Alterations and Additions to Town Hall	Kendal Corporation	30*l.* 20*l.* 10*l.*	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Repair of Highways	Dynas Powis Highway Board	E. R. Lewis	Mar. 31
Residence at Asylum, Thorpe, Norwich	Visitors	T. H. B. Heslop	do.
Catholic Institution, Kingstown, Dublin		J. Kelly Freeman	do.
Bowling Green Pavilion	Salford Corporation	*Official*	do.
Two Dwelling-houses, Archibald-street, Gloucester		J. F. Trew	do.
Sewerage Works	Hove Commissioners	*Official*	April 1
*Works and Materials	Finchley Local Board	do.	do.
*Fire Escape Staircases at Workhouse	West Ham Union	F. J. Sturdy	do.
Twenty-eight Labourers' Dwellings, Road-making, &c. Randalstown, Ireland	C. J. Webb	J. Lanyon	April 2
Sewerage Works	Vstradyfodwg Loc. Bd.	J. W. Jones	do.
Additions to Board Schools, Treharris	Merthyr Tydfil Sch. Board	J. Williams	April 3
Main Pipe Sewer, Hartshead	Sheffield Corporation	G. Alsing	do.
*Cleaning and Painting Buildings, &c.	M. R. Co.	*Official*	do.
Petty Sessions Court, Great Witley	Worcestershire Standing Joint Committee	H. Rowe	do.
Vagrant Wards, Keswick	Cockermouth Union	G. D. Oliver	April 4
*Raising Building and Constructing Concrete Floor and Roof	Sheffield United Gas Light Co.	F. W. Stevenson	April 6
Main Sewerage Works	Houghton-le-Spring Local Board	D. Balfour	do.
Stables, &c. Fairwater, Cardiff	Edgar David	Halliday & Anderson	do.
*Re-forming Road	Acton Local Board	D. J. Ebbetts	do.
*Road Works	Hendon Local Board	S. S. Grimley	do.
Twenty Houses, Regent-street, Ferndale	Duffryn Hotel Building Club	M. Morris	do.
New Road, Banks, Fencing, &c.	Llandaff Highway Bd.	Jas. Holden	do.
Alterations and Additions to Asylum, Exminster	Devon County Council	E. H. Harbottle	do.
Tubes, Wires, Fittings, &c.	Lancs. & Yorks. Rail.	*Official*	do.
*Paving Streets	Camberwell Vestry	do.	do.
Sixty-nine Cottages and Road Works, Cadoxton, South Wales	Riverside Cottage Bldg Co. Lim.	E. M. Bruce Vaughan	April 8
Reservoir, Pipes, Hydrants, &c. Ellerby	Henderwell (Yorks) Local Board	*Official*	do.
Primitive Methodist Chapel, Lemington, Northumberland		Geo. Race	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Branch Stores and Agent's House, Thornton, near Halifax	Queensbury Indus. Soc	H. Hodgson	April 9
Parish Church, Castlebar, co. Mayo	Rev. P. Lyons	W. G. Doolin	April 10
Retaining Wall, Iron Fence, &c.	Hampton Local Board	J. Kemp	April 11
*Road Materials	County of Chester	S Bull	do.
*Erection of Hoarding	Holborn Union	H. Saxon Snell	April 14
New Schools, Bristol-road	Bath School Board	W. J. Willcox	do.
*Sewerage Works, Mitcham-lane	London County Council	*Official*	do.
*Paving, &c. Works, Rosebery-avenue	do.	do.	do.
Two Tenements, Saltmarket	Glasgow Impt. Trust.	do.	do.
Works at Manse, Second Donegore, Irelnd		Andrew Murdock	April 15
*Works and Materials	Strand Bd. of Works	*Official*	do.
Widening Bourne Bridge, Ipswich	Committee	E. Buckham	
		H. Miller, Jun.	April 20
Sewerage Works, Hirwain-street	Aberdare Local Board	*Official*	April 22
*New Offices	New Barnet Valley Local Board	F. W. Shenton	April 27
*Construction of Storage Reservoir, &c.	Bristol Water Co.	T. & C. Hawksley	April 30
*New Grammar School, Chelmsford	King Edward VI. Grammar School	H. A. Cheers	No date
Re-building 70 roods Stone Wall, Intack, Caldbeck	A. Rilson		do.
Three Houses, New Leeds	Mr. Evers		do.
Extension of Workshops, Bramley, Leeds	T. Haley & Co.		do.
Two Shops and Dwelling-houses, Ilkley	W. Scott	A. Marshall	do.
Sinking Two Pits (450 yds. deep), Maesteg, South Wales	North's Navigation Collieries, Lim.	Forster, Brown, & Rees	do.
Two Villas, Usk	Dr. C. Boulton		do
Reservoir, near Durham	Sacriston Colliery		do.
*Re-building Tower, &c. Waddesdon Church Bucks	Rector & Churchwrdns	W. White	do
Warehouses and Stables, Matilda-street, Sheffield		A. R. Walker	do.
Public School, Macdonald	Rutherglen (N.B.) Sch. Board	Walker & Cameron	do.
Warehouse, Maryleport-street, Bristol		H. J. Jones	do.
Fire Brigade Station	Leicester Corp.	W. E. Keites	do.
*Road Works	Newtown (N. Wales) Local Board	*Official*	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Applications to be in
*Clerk of Works	Norwich Corp.	3*l.* weekly	April 2
*Sewerage Works Manager	Richmond Main Sewerage Board	350*l.*	April 6
*Sewerage Works Foreman Engineer	do.	2*l.* 10*s.* &c.	do.
Mechanical and Electrical Engineer	Bristol Corporation	300*l.* per annum	May 1
*Assistant Secretary	Architectural Assoc.	100*l.*	No date

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv. *and* vi. *Public Appointments, p.* xviii.

MISCELLANEOUS.

THE MOVEMENT FOR THE REGISTRATION OF PLUMBERS.—The Mayor of Bradford (Councillor Hammond) presided on the 17th inst. at a large public meeting held in the Bradford Technical College, when a District Council was elected, including the Mayor, the Chairman of the Sanitary Committee, the Medical Officer, and a number of master and operative plumbers, to carry out the national registration system. Besides a large gathering of representatives of the plumbing trade, including Mr. J. Allen (delegate from the United Operative Plumbers' Association of Great Britain and Ireland), there were present Alderman F. Priestman, Alderman Moulson, Dr. Hime, Mr. Cox (Borough Surveyor), Mr. W. T. McGowen (Town Clerk), and Sir Philip Magnus, and the Clerk of the Plumbers' Company (as a deputation from London). ——Professor A. Crum-Brown, of Edinburgh University, delivered a lecture on "Lead and other Metals and Alloys," at Dundee, on the 20th inst. The lecture was given under the auspices of the District Council for Forfar, Perth, and Fife for the National Registration of Plumbers. There was a large attendance of master and operative plumbers. In the absence of Lord Provost Mathewson, who was detained in London, Bailie McCulloch presided, supported on the platform by Professor Frankland and Dr. Lennox. In the course of his very instructive lecture, Professor Crum-Brown explained the nature and properties of different metals, directing his remarks more particularly to describing the alloys of lead and tin, suggestive illustrations of which he also gave. Professor Frankland, in moving a vote of thanks to the lecturer, pointed out the responsibility that devolved on plumbers in regard to the public health, stating that if plumbers would attend to drains and water fittings in a scientific manner, the community would be immensely benefited. A vote of thanks having been passed to the chairman, the meeting was brought to a close by Certificates of Registration being presented to a number of master and operative plumbers.

HOUGHTON-LE-SPRING SURVEYORSHIP.—Mr. William Taylor, of Eastgate, has been appointed sanitary inspector to the Houghton-le-Spring Union, in succession to Mr. Osselton, who is going to Dumfriesshire, to fill the office of chief sanitary inspector to the County Council.

THE COUNTY COUNCIL AND OVERHEAD WIRES.—The inquiry by a Select Committee of the House of Commons upon the Bill promoted by the London County Council for, principally, causing the removal of overhead telephone wires into subways, and prohibiting aërial lines in the future, had a strange ending. Besides this provision, the Bill proposed to give power to officials to enter houses to examine and supervise wires, and also to authorise the exaction of payment by wire-owners for such inspection. The National Telephone Company objected to the measure as calculated not only to put them to enormous expense in removing their existing wires and making subways, but to render their present single-wire system utterly useless, inasmuch as only double wire, with elaborate insulating covering, would be practicable underground. They further objected to a proposal to make them register all their wires as another serious cause of trouble and expense; and eventually the opposition all round was so successful that the Committee, while passing the preamble of the Bill, struck out all reference to subways and to making the Company transfer their wires to subways, omitted the suggested right of entry for inspection, and also declined to sanction the proposed exaction of payment for supervision. Presumably there was something left of the Bill, seeing that it was duly reported to the House by the Committee, but the excisions mentioned were somewhat destructive, to say the least of it, of the main purposes of the measure. It rarely happens that a Bill is slashed about to this extent, and yet passed, —"with amendments."

THE ENGLISH IRON TRADE.—While the English iron maket is very quiet—in fact, quieter than at any previous period of the year—its tone is exceedingly week. The decline in values would be still more marked than it is were it not for the fact of manufacturers keeping out of the market from sheer inability, owing to comparative dearness of fuel and high wages, of accepting the low prices offered. There has been another drop in pig-iron, induced by a further fall in warrants. Scotch makers' iron is from 1s. to 2s. a ton lower; Cleveland pig has declined 1s. a ton. There has been a corresponding easing off in Southern brands, while Bessemer pig in the North-west has lost 2s., with hematite warrants 1s. cheaper. There is a dead dulness in finished iron, but so far no actual reductions are announced in rates. For this, if they are to come, we must wait for the quarterly meetings. Steel is equally little inquired for, with a slightly better demand for shipbuilding steel, however. Shipbuilders are not by any means slack as yet, but they will be soon unless the demand for tonnage sets in more actively than it is at present. Work in most branches of the engineering trade is well maintained.—*Iron.*

EAST PRINCES-STREET GARDENS, EDINBURGH.—The plans of Mr. E. Milner for the treatment of the East Princes-street Gardens under the scheme for the enlargement of the Waverley Station, arrived last week in Edinburgh. Mr. Milner had carefully examined the gardens about six weeks ago, and the plans submitted to the House of Lords Committee were the result of his personal inspection of the ground. According to the *Scotsman*, the present size of the East gardens will not only be maintained, but will even seem to be slightly increased. On the north side of the railway the space scheduled, measuring from the present retaining wall, is 58 ft. at the east end and 40 ft. at the west end, next the Mound tunnel. Along the extended boundary, represented by the rope line with which the citizens are now familiar, a new low retaining wall will be built. Along the line of the present wall there will be a row of iron pillars, and between each pillar and the new wall an iron girder. Built between the girders will be a series of brick archways to form a roof for the portion of the garden covered in. On the top of this roof there will be placed 4 ft. or 5 ft. of earth, and the bottom of the garden along its whole length will be filled up 10 ft., or to the level of the earth on the top of the roof referred to. The garden will in this way present a flat surface with an area as large as it is at present. The plans show along the edge of the railway a line of shrubs to screen the view, and the rest of the garden is laid out in an ornamental way, which on the plan commends itself to the eye on account of the excellent character of the design. The south side of the garden will be treated in exactly the same manner in respect of constructive details, and the manner in which the garden will afterwards be laid out.

ELECTRIC LIGHTING IN CALCUTTA.—It is stated that the Howrah Bridge is shortly to be lighted by electricity, which will be a very great improvement upon the present system of lighting. At present, indeed, the bridge is very badly lighted, there being no lights at all upon the movable section, which is 200 ft. long. The remainder of the bridge and the boat-opening below are also very indifferently lighted. It is now proposed, however, to place thirteen arc lights on the roadway of the bridge, each of 2,000-candle power, and four similar arc lights for the boat-openings, with eighteen strong incandescent lights for the signal-stations, watch-house, and engine-house. The aggregate power will be 34,384 candles, and, to prevent the possibility of failure, the plant will include a spare engine, boiler, and dynamo. The contractors are Messrs. Laing, Wharton, & Down, who have been selected to supply the electric lighting plant for the Kidderpore Docks, and who number among their more recent works the installations at St. Pancras Station and the Chelsea Military Exhibition. The cost of the Howrah Bridge plant is to be 42,050 Rs., and this sum will be provided out of surplus revenue.—*Indian Engineer.*

MEETINGS.

TUESDAY, MARCH 31.

Birmingham Architectural Association.—Mr. A. Harrison on "Bosbury Church." 7.30 p.m.

WEDNESDAY, APRIL 1.

Civil and Mechanical Engineers' Society.—Mr. W. Lee Beardmore on "Compulsory Registration of certain Buildings as to their Sanitary Efficiency." 7 p.m.

FRIDAY, APRIL 3.

Institution of Civil Engineers.—Students' Visit to the Mechanical Laboratory of the City and Guilds of London Central Institution, Exhibition-road, South Kensington. 2 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

5,818.—STAIRCASES: *R. Howson.*—The improvement which is the subject of this patent consists in placing a spring or springs underneath the footboard or "tread" of each step so as to deprive it of its usual rigidity, and to impart to it the property of yielding somewhat to the pressure of the foot in ascending and descending.

5,719.—CEMENT: *W. R. Taylor.*—According to this specification, liquid fuel is used alone or in conjunction with solid fuel to aid and assist in the burning of the cement material. This burning is also facilitated by feeding the material in a pulverised state into a rotating chamber, heated by the combustion within it of powdered coal and air.

6,088.—KILNS: *E. Brook.*—By this invention gas and air are supplied to these heated kilns, so that they may be utilised for burning the bricks, and when a number of these kilns are used in rotation they are worked regeneratively, *i.e.*, the heat given off in cooling by one of them may be caused to heat the air for burning the gas in the next one; and the hot waste products of combustion from a kiln undergoing the firing process heats up one or more kilns previously to being fired, or heats air to use with the bottom supply of gas.

13,318.—WINDOWS AND SASHES: *W. J. E. and E. J. E. Henley and Thomas Spurrier.*—The sash which is the subject of this patent is made in two or more parts; the sliding-frame and the glass-frame. These are hinged so that they fold inwards, and the folding bar also serves as a support for flower-pots or ornaments when opened inwards towards the room. Provision is made for fastening the cords to the sliding stiles by threading the ropes down to a slot through which they are drawn, and readily fastened without disturbing the beads.

16,473.—DOOR-CHECKS, &c.: *E. J. Blount.*—This refers to an improvement upon the ordinary pattern of door-closer and door-check in which liquid is employed as an element to resist the free action of the door-closing spring.

19,446.—HANGING DOORS: *H. J. Dwight and Others.*—This relates to hanging doors within door-cases or frames so that they may be opened from either side by pushing or pulling at either outer edge.

291.—CONCRETE FLOORS, &c.: *T. Potter.*—For the purpose of resisting fire, floors are, according to this invention, made in two portions with air space between them, and special provision is made by the shape of them and by upholding them by means of cantilever brackets to prevent their disintegration or destruction by fire.

NEW APPLICATIONS FOR PATENTS.

March 9.—4,958, L. Pickup, Window Fastener.—4,161, T. Kemp, Testing Drains.

March 10.—4,247, J. Adair, Baker's Ovens.—4,287, T. Panario, Supplying disinfectants to the flushing pipes of water-closets, &c.—4,290, W. Kelleher, Show-case and Shop Partition.—4,300, F. Tyers and O. Barnsdale, Plumber's Joints.—4,304, A. Boult, Carving or Cutting Machines.

March 11.—4,333, S. Campion, Moulding Apparatus for Filling with Molten Lead Incised Letters or Ornamentation in Marble, Stone, &c.—4,336, H. Bishop & Son, Construction of Streets, Roads, &c.—4,349, R. Mountain, Brick-making Machines.—4,359, D. Brown, Wood Screws, &c.—4,364, W. Munns, Shutter-fastening Device.—4 386, C. Inwood, Rotary Ventilating Fans, &c.—4,408, S. Chitty and B. Williams, Stay or Fastener for Casements, Skylights, &c.

March 12.—4,424, A. Kershaw, Ventilators. 4,428, J. Kaye, Latches for Doors.—4,435, G. Winship, Rotary Drain and Sewer Cleaner.—4,484, J. Townshend, Folding or Collapsible Seats.

March 13, 4,509, A. Mitchel-Jones, Rose-bits and similar boring tools.—4,519, W. Clark, Glazing.—4,522, C. Huelser, Brick Presses.—4,526, J. Smith, Ventilation of Soil Pipes, &c.—4,532, T. Edden, Construction of Tongue and Groove Fire-clay Tiles and Bricks.—4,541, W. Gage, Handle for Chisels.—4,552, R. Chantry and W. Peters, Waste Water Preventers.

March 14.—4,593, F. Ryan, Plumb Rules.—4,610, F. Plant, Ovens, Kiln, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15,939, E. Orford, Flush Bolts and Barrel Bolts.—2,012, J. & J. Campbell, Flushing Cisterns.—2,078, W. Munns, Door-holders.—2,111, R. Foulkes and others, Connecting or Joining Earthenware and Metal Drain or other Pipes.—2,116, J. Aspinall, Whitewash-brushes.—2,494, R. Duncan, Door Stops, &c.—2,563, G. Goldsmith, Fixed or Movable Chimney Cowls. — 2,645, W. De-Morgan, Fire-grates or Fire-places.—3,185, T. Gregson, Ventilating Fans.—3,326, A. Pochin, Construction of Roadways, &c.—3,419, W. Munns, Scroll Sawing Machines.—3,558, J. Barlow, Glazing Without the Use of Putty, &c.—3,797, G. Skelsey, Portland Cement.—3,832, J. Noad, White Lead.—3,833, H. Sturn, Hollow Tiles.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

6,848, R. & W. Thomason & Sons, Valveless Syphon Flushing Cisterns of Water-closets.—2,313, J. Golding, Self-adjusting Strips for Excluding Draughts from the Bottoms of Doors.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

MARCH 16.—By *Reynolds & Eason:* 8, Butler-st., Spitalfields, f., r. 41*l.* 12s., 530*l.*; 12, Tenter-st., f., r. 36*l.* 8s., 385*l.*—By *Furber, Price, & Furber:* 2a, 3a, and 4a, Russell mews, Kensington, u.t. 70 yrs., g.r. 18*l.*, r. 99*l.*, 790*l.*—By *Dolman & Pearce:* 23 and 25, Studley-rd., Clapham, u.t. 47 yrs., g.r. 5*l.*, r. 78*l.*, 650*l.*; 5 and 7, Wray-crescent, Hornsey, f., r. 80*l.*, 1,120*l.*; f.g.r. of 6*l.*, with reversion in 74 yrs., 200*l.*—By *Fuller & Fuller:* 2, Castle-ter., Notting-hill, u.t. 70 yrs., g.r. 26*l.* 10s., r. 200*l.*, 2,925*l.*; 26 and 31, Albert-ter., Islington, u.t. 56 yrs., g.r. 12*l.*, r. 70*l.*, 560*l.*; 12, Grove-ter., Tottenham, u.t. 85 yrs., g.r. 8*l.* 8s., r. 36*l.*, 185*l*; 14, Grove-ter., u.t. 85 yrs., g.r. 7*l.* 7s., 195*l.*: 24 and 26, Stracey-rd., Forestgate, f., r. 50*l.* 14s., 605*l.*

March 17.—By *T. Wade & Co.:* 267,271, and 273, Amhurst road, Hackney, u.t. 75 yrs., g.r. 19*l.*, r. 93*l.*, 895*l.*; 275, Amhurst-rd., u.t., 75 yrs., g.r. 1*l.*, r. 33*l.*, 415*l.*; 341, Amhurst-rd., u.t. 75 yrs. g.r. 6*l.*, r. 40*l.*, 435*l.*—By *Montagu & Robinson:* 13 and 14, Gough-rd., Stratford, f. r. 36*l.* 8s., 275*l.*; freehold rent charge of 2*l.* a year, Bexley Heath, 41*l.*—By *Debenham, Tewson & Co.*, "Mill Hill Lodge," with grounds, Barnes Common, f. 1,700*l.*; Albert-gate, Hyde Pk., f. riding school and stabling, area 16,900 ft. 60,000*l.*; 21, De Beauvoir-sq., Kingsland, u.t. 22 yrs., g.r. 6*l.* 10s., r. 38*l.*, 190*l.*; 85, 87, and 91, Green-lanes, Stoke Newington, u.t. 90 yrs., g.r. 45*l.*, r. 130*l.*, 785*l.*; 30, 31, and 36, Galway-st., St. Luke's, u.t. 9 yrs., g.r. 51*l.*, r. 88*l.*, 70*l.*; 59 and 61, Vicarage-rd., Tottenham, f., r. 46*l.* 16s., 460*l.*; 22 and 24, Gothic-villas, f., r. 39*l.*, 340*l.*; 4 and 5, Laurel-villas, u.t. 78 yrs., g.r. 5*l.*, 95*l.*; 6, 8, and 10, Adelaide-ter., u.t. 87 yrs., g.r. 6*l.* 6s., r. 80*l.*, 570*l.*; 2 to 22 (even), Stonebridge-rd., u.t. 88 yrs., g.r. 55*l.*, r. 228*l.* 16s., 810*l.*; 77, 79, and 83, Stonebridge-rd., u.t. 88 yrs., g.r. 19*l.* 10s., r. 72*l.* 16s., 250*l.*; 1 and 3, Brunner-rd., Walthamstow, u.t. 89 yrs., g.r. 6*l.*, r. 65*l.* 2s., 115*l.*; 12 to 22 (even), Evelyn-rd., Victoria Docks, u.t. 94 yrs., g.r. 21*l.* 15s., r. 101*l.* 8s., 340*l.*

MARCH 18.—By *W. M. Ogden:* The Residence "Stoneleigh," Worple-rd., Wimbledon, u.t. 84 yrs., g.r. 15*l.*, 1,200*l.*—By *Hobson, Richards, & Co.:* F.g.r. of 10*l.*, Hoxton, with reversion in 1903 to 159*l.* a year, 1,000*l.* By *Norton, Trist, & Gilbert:* F.g r. of 42*l.*, Tollington-pk., Holloway, with reversion in 73 yrs., 1,100*l.*; f.g.r. of 54*l*, Moray-rd., with reversion in 73 yrs., 1,440*l.*; twelve plots of freehold land, Clapham-pk., 4,520*l.*—By *Lees & Burchell* (at Redhill): "The Thimble and Nutmeg Grater" beer-house, also cottage and dairy, Warwick-rd., Redhill, u.t. 54 yrs., g.r. 2*l.* 10s.; 1,460*l.*; two f. cottages, Church-rd., Reigate, r. 28*l.* 12s., 400*l.*; "Holly Cottage," Redhill Common, f., r. 11*l.* 14s., 215*l.*

MARCH 19.—By *Messrs. Aldridge:* A plot of freehold land, Wiverton-rd., Sydenham, 50*l.*—By *H. J. Bliss & Sons:* a moiety of the "White Hart" P.H., Walworth-rd., r. 150*l.*, 1,660*l.*; 40 to 46 (even) Bond-st., Vauxhall, f., r. 75*l.*, 1,280*l.*; two freehold cottages, Orpington, Kent, r. 27*l.* 19s., 250*l.*; 36 to 42 (even) Ellesmere-rd., Bethnal-green, u.t. 74 yrs., g.r. 16*l.*, r. 144*l.* 6s., 1,110*l.*; 7, Minto-pl., u.t. 28 yrs., g.r. 4*l.*, r. 28*l.* 12s., 140*l.*; a plot of freehold land, Herbert-rd., Walthamstow, 180*l.*—By *Newbon & Co.:* 168, Highbury New-pk., Highbury, u.t. 59 yrs., g.r. 12*l.* 12s., 965*l.*; 37, Avenell-rd., u.t. 85 yrs., g.r. 6*l.* 6s., 280*l.*; 36, Eden-grove, Holloway, u.t. 68 yrs., g.r. 6*l.*, 305*l.*; 13 and 15, Hanley-rd., Hornsey, f., 1,195*l.*; No. 417, Kingsland-rd., u.t. 35 yrs., g.r. 6*l.*, r. 45*l.*, 270*l.*—By *E. Stimson:* The f. residence, "Haldon," Percy-rd., Hampton, 1,100*l.*; 1 to 10, Cornwall-pl., Lambeth, u.t. 17½ yrs., g.r. 25*l.*, r. 130*l.*, 360*l.*; 19, Kilburn Pk.-rd., Kilburn, u.t. 60 yrs., g.r. 6*l.*, 455*l.*; 38 to 44 (even), Naylor-rd., Peckham, u.t. 86 yrs., gr. 19*l.* 12s. 8d., 810*l.*; 16 to 24 (even), Goldsmith-rd., f., r. 93*l.* 12s., 625*l.*; 22, 24, and 26, Costa-st, u.t. 73 yrs., gr., 12*l.*, r. 78*l.*, 560*l.*; 26, Peckham Rye, u.t. 15 yrs., g.r, 22*l.*, 190*l.*; 177, Peckham Rye, f., r. 26*l.*, 100*l.*; 2, 3, and 9, Hern-villas, u.t. 88 yrs., g.r. 18*l.*, r. 88*l.*, 695*l.*; 1 and 2, Tagg's-cottages, f. 340*l.*; "Stuart House," Stuart-rd., f., r., 31*l.* 4s., 205*l.*; a plot of freehold land, Hall-rd., 70*l.*

March 20.—By *W. B. Hallett:* A plot of f. land, Clacton-on-Sea, 125*l*; By *F. J. Bisley:* 108, Princes-rd., Bermondsey, f., r. 15*l.* 12s., 180*l.*; 389, Southwark Pk.-rd., u.t. 56 yrs., g.r. 5*l.* 5s., 390*l.*; 97, 98, 99, and 100, Princes-rd. u.t. 32 yrs., g.r. 14*l.* 13s., r. 109*l.* 4s., 620*l.*; 38 to 42, and 76 to 79, Travers rd., Southgate, u.t. 85 yrs., g.r. 18*l.*, 50*l.*; 2, Gallatly-rd., New Cross, u.t. 68 yrs, g.r. 5*l.* 5s. r. 38*l.*, 370*l*; 30 and 32, Gallatly-rd., u.t. 61 yrs., g.r. 10*l.* 10s., r. 60*l.*, 580*l.*; 11 and 13, Gallatly-rd., u.t. 68 yrs., g.r. 10*l.* 10s., r. 60*l.*, 560*l.*; 23, West Sq., Southwark, u.t. 12 yrs., r. 50*l*, 43*l.* By *Ball, Norris, & Hadley:* 67 and 69, Sumatra-rd., Hampstead, u.t. 94 yrs., g.r. 10*l.*, r. 56*l*, 410*l.*; 4, Parkhurst-ter., Southgate, u.t. 86 yrs., g.r. 6*l.* 10s., r. 23*l.* 8s., 125*l.*; two plots of f. land, Claremont-rd., Highgate, 190*l.*—By *R. Reid:* 20, Taviton-st., Gordon-sq., u.t. 60 yrs., g r. 5*l.*, r. 130*l.*, 1,770*l.*: 57, Gordon-sq., u.t. 32 yrs., g.r. 15*l.*, r. 120*l.*, 1,360*l.*; l.g.r. of 50*l.*, York-rd., Camden Town, u.t. 57 yrs., at a peppercorn, 920*l.*; l.g.r. of 128*l.*, Walworth. u.t. 59 yrs., g.r. 24*l.*, 2,150*l.*; 159 and 159a, High-rd., Kilburn, f., r. 110*l.*, 1.500*l.*; 165, High-rd., f., r. 80*l.*, 1,250*l.*; 24, Westbourne Pk-rd., Paddington, u.t. 452 yrs., g.r. 9*l.*, r. 70*l.*, 750*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.			
Greenheart, B.G.	ton	6/10/0	7/15/0
Teak, E.I...	load	8/10/0	14/0/0
Sequoia, U.S.ft.cu.		2/3	3/0
Ash, Canada	load	2/10/0	4/5/0
Birch, do.		2/5/0	4/5/0
Elm, do.		3/10/0	4/15/0
Fir, Dantsic, &c.		2/0/0	3/15/0
Oak, do.		2/10/0	4/10/0
Canada		4/17/6	6/10/0
Pine, Canada red		2/10/0	3/10/0
Do, yellow		2/0/0	5/10/0
Lath, D'ntsic, fath		5/0/0	6/0/0
St. Petersburg		5/0/0	7/0/0
Deals, Finland, 2nd & 1st std	100	7/0/0	10/0/0
Do, 4th & 3rd		7/0/0	8/0/0
Do, Riga		6/0/0	7/10/0
St. Petersburg, 1st yellow		9/0/0	14/0/0
Do. 2nd yellow		8/0/0	9/0/0
Do. white		6/10/0	10/0/0
Swedish		6/10/0	15/0/0
White Sea		8/0/0	16/10/0
Canada, Pine 1st		13/0/0	24/0/0
Do. do. 2nd		9/0/0	15/10/0
Do. do. 3rd, &c.		6/10/0	10/0/0
Do. Spruce, 1st		8/10/0	10/10/0
Do. do. 3rd & 2nd		6/0/0	7/10/0
New Brunswick		5/0/0	7/0/0
Battens, all kinds		3/10/0	15/10/0
Flooring Boards, sq., 1 in. prep. 1st		0/10/0	0/14/0
Do. 2nd		0/9/0	0/10/6
Other qualities		0/5/0	0/7/6
Cedar, Cuba	ft.	/4	/4½
Honduras, &c.		/4	/4½
Mahogany, Cuba.		/4½	/6½
St. Domingo, cargo av		/4½	/6½
Mexican do. do		/4½	/5½
Tobasco do. do		/5½	/7
Honduras do..		/5½	/6½
Box, Turkey	ton	4/0/0	13/0/0
Rose, Rio		10/0/0	20/0/0
Bahia		9/0/0	18/0/0

TIMBER (*continued*).			
Savin, St. Domingo	ft.	0/0/10	0/1/3
Porto Rico		0/0/9	0/1/6
Walnut, Italian		0/0/3½	0/0/7
METALS.			
IRON—Bar, Welsh, in London	ton	6/5/0	6/15/0
Do. do. at works in Wales		5/15/0	6/5/0
Do. Staffordshire, in London		6/5/0	7/0/0
COPPER—British, cake and ingot		56/0/0	57/0/0
Best selected		59/0/0	60/0/0
Sheets, strong		66/0/0	0/0/0
Chili, bars		52/10/0	0/0/0
YELLOW METAL	lb.	0/0/6	0/0/6½
LEAD—Pig, Spanish	ton	12/11/3	12/12/6
English, com. brands		12/15/0	0/0/0
Sheet, English, 3 lbs. per sq. ft. and upwards		14/5/0	0/0/0
Pipe		14/15/0	0/0/0
ZINC—English sheet	ton	27/3/0	0/0/0
Vieille Montagne		27/3/0	0/0/0
TIN—Straits		90/10/0	0/0/0
Australian		90/15/0	0/0/0
English Ingots		94/10/0	0/0/0
OILS.			
Linseed	ton	22/12/6	22/17/6
Cocoanut, Cochin		36/0/0	0/0/0
Do. Ceylon		29/0/0	29/5/0
Palm, Lagos		27/0/0	0/0/0
Rapeseed, English pale		29/15/0	30/0/0
Do. brown		28/5/0	28/10/0
Cottonseed refined		21/10/0	0/0/0
Oleine		21/15/0	24/0/0
Lubricating, U.S.		6/0/0	7/0/0
Do. refined		7/10/0	12/0/0
TAR—Stockholm	barrel	1/1/6	1/2/0
Archangel		0/13/6	0/0/0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

CARLISLE.—For the erection of a brick boundary-wall round the Fusehill-street recreation-ground, for the Corporation of Carlisle. Mr. W. Howard Smith, C.E., City Surveyor, Town-hall, Carlisle:—

J. & W. Baty	£296 0 0	T. Creighton	241 0 0
J. Beaty, Carlisle*	£228 15 0		226 10 8

* Accepted.

CARLISLE.—For a wrought-iron unclimbable fence at Fusehill-street-recreation ground, for the Corporation of Carlisle. Mr. W. Howard Smith, C.E., City Surveyor, Town-hall, Carlisle:—

Pratchitt Bros.	£175 9	G. Howe	£147 12
J. Edmondson	159 10	R Short	135 0
Exors. of D. Clarke	157 4	W. Glendinning & Son	128 14
R. Gouge	152 15	J. & J. Wharton, Carlisle*	127 10

* Accepted.

DUBLIN.—For the erection of St. Bartholomew's Church Home, Clyde-road, Dublin. Sir Thos. N Deane & Son, architects, 3, Upper Merrion-street, Dublin:—

B. Whyte	£2,390 0 0	Hudman & Co.	£1,984 0 0
Wm. Harpur	2,300 0 0	R. Farquharson	1,905 5 2
Ben. Pemberton	2,265 0 0	J. Pemberton & Son	1,900 0 0
C. Higginbotham	2,023 0 0	John Good	1,893 0 0
John Pemberton	2,007 0 0	H. & J. Martin, Dublin*	1,886 0 0
Collen Bros.	2,004 0 0		
N. Williams	2,000 0 0		

* Accepted.

FULHAM.—For making up and paving Ashington- and Cristowe-roads, for the Vestry of the Parish of Fulham. Mr. W. Sykes, New Streets Surveyor:—

Name of Contractor.	Ashington-road.				Cristowe-road.			
	R.	Y.	V.	I.	R.	Y.	V.	I
	£	£	£	£	£	£	£	£
Imperial Stone Co.	—	—	—	132	—	—	—	133
Nowell & Robson	322	172	—	141	305	176	—	144
T. Adams	293	172	149	138	274	174	151	139
G. Bell	326	184	159	153	304	192	163	155
Tomes & Wimpey	346	175	166	148	326	173	164	146

R.—All work except the actual paving. Y.—York stone paving.
V.—Victoria stone paving. I.—Imperial stone paving.

FULHAM.—For sewers for the Vestry of the Parish of Fulham. Mr. James P. Norrington, Surveyor:—

Sewer, Fulham Palace-road.

T. Adams	£2,482 0 0	Nowell & Robson	£2,270 0 0
Killingback	2,410 0 0	J. H. Neave	2,098 0 0
Tomes & Wimpey	2,325 0 0	J. Mears	2,075 0 0

Colehill-lane Sewer.

Killingback	£635 0 0	J. Mears	£582 0 0
T. Adams	620 0 0	Tomes & Wimpey	573 0 0
Nowell & Robson	610 0 0	R. Mullett	557 0 0
J. H. Neave	587 0 0	E. Parry	545 0 0

Border-road Sewer.

Killingback	£552 0 0	T. Adams	£459 0 0
Nowell & Robson	520 0 0	R. Mullett	451 0 0
E. Parry	479 0 0	J. Mears	435 0 0
J. H. Neave	466 0 0	Tomes & Wimpey	425 0 0

LEE (Kent).—For building new parish room, &c., to Christ Church, Lee. Mr. A. H. Skipworth, 5, Staple Inn, Holborn, E.C., architect. Quantities by Messrs. Northcroft, Son, & Neighbour, 57, Charing-cross:—

Spencer & Co.	£1,075	Whitehead & Co.	£1,050
G. F. Havell	1,074	S. J. Jerrard	1,027

LEEDS.—Accepted for the erection of ten through houses, Elford-grove, for the Leeds Industrial Co-operative Society. Mr. W. S. Braithwaite, architect, Leeds:—

Bricklayer and Mason.—Winterburn & Thackeray	£1,285 0 0
Plumber.—Geo. Lazenby	239 0 0
Slater.—Geo. Milner	91 0 0
Plasterer—J. Dakin	187 10 0
Painters—Oliver & Barraclough	75 13 1

[The Society employ their own joiners.]

LEEDS.—Accepted for the erection of new stores, Elford-grove, Roundhay-road, for the Leeds Industrial Co-operative Society, Limited. Mr. W. S. Braithwaite, architect, 6, South-parade Leeds:—

Bricklayer and Mason—Thompson & Son, Leeds	£755 0
Plumber.—Geo. Lazenby, Leeds	194 0 0
Plasterer—J. Dakin, Leeds	16 0 0
Ironwork.—I. Roberts & Co., Bradford	181 13 6
Slater.—Geo Milner, Leeds	31 0 0
Painters.—Oliver & Barraclough	40 2 0

[The Society will do their own joiner's work.]

LIVERPOOL.—For warehouse, Liverpool. Mr. L. Osborne Williams, architect, 70, Victoria-street, Liverpool:—

Evan Morgan	£1,161 7 7	Brown & Backhouse, Chatham-street, Liverpool (accepted)	893 0
W. H. Bleakley	1,115 0 0		
Charles Burt	938 0 0		
James Paterson	900 0 0	Perte Tyson	889 0 0

LONDON.—For the erection of a school to provide accommodation for 1,000 children on the Glyn-road site, Homerton, and also for the erection of a schoolkeeper's house, with a room underneath suitable for technical purposes, for the School Board for London. Mr. T. J. Bailey, Architect:—

		If glazed bricks are used for halls, &c., add
S. & W. Pattinson	£16,973	£920
Atherton & Latta	16,779	984
Dove Brothers	16,388	964
Chas. Cox	16,261	975
Killby & Gayford	16,096	957
J. W. Hobbs & Co., Ld.	16,042	860
Hart Bros.	15,707	1,051
Foster & Dicksee	15,526	1,072
E. Lawrance & Sons	15,024*	895*

* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of a school to provide accommodation for 1,200 children, on the site in Munster lane, Fulham, and also for the erection of a schoolkeeper's house, with a room underneath suitable for technical purposes, for the School Board for London. Mr. T. J. Bailey, Architect:—

		If dadoes be built in glazed brick-facing, add—
Peto Bros.	£19,270 0 0	£1,394 0 0
Killby & Gayford	19,066 0 0	1,380 0 0
Hart Bros.	19,008 0 0	1,416 0 9
Holloway Bros.	18,719 0 0	1,075 0 0
S. & W. Pattinson	18,662 0 0	1,000 0 0
J. T. Chappell	18,555 0 0	1,280 0 0
T. Boyce	18,319 0 0	1,200 0 0
J. W. Hobbs & Co.	17,850 0 0	1,020 0 0
Henry Lovatt	17,253 13 2	1,014 17 7
Foster & Dicksee	17,018 0 0*	1,198 0 0*

*Recommended by the Works Committee for acceptance.

LONDON.—For providing heating apparatus on the low-pressure hot-water system for the portion of the West-square School which is now in course of erection, and a new boiler, and also for extending the apparatus to the class-rooms in the old portion of the school, for the School Board for London. Mr. T. J. Bailey, Architect :—

J. Smeaton, Son, & Co.	£755 0 0	J. W. Wontner, Smith, Grey, & Co.	£572 10 0
W. G. Cannon	748 0 0	Comyn Ching & Co.	519 0 0
John Fraser & Son	746 0 0	Jones & Attwood*	415 0 0
C. P. Kinnell & Co.	640 0 0		
Rosser & Russell	596 10 0		

* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of a school to provide accommodation for 800 children on the site in Bird in Bush-road, and also for the erection of a schoolkeeper's house, with a single cookery centre underneath, for the School Board for London. Mr. T. J. Bailey, Architect :—

		Add for white glazed brick facings, &c.
J. T. Chappell	£19,158 0 0	£1,343 0 0
Treasure & Son	18,895 0 0	919 0 0
Hart Bros.	18,435 0 0	1,314 0 0
J. Longley & Co.	18,415 0 0	979 0 0
Foster & Dicksee	18,168 0 0	1,077 0 0
J. Shillitoe & Son	17,596 0 0	1,176 0 0
J. W. Hobbs & Co., Limited	17,362 0 0	884 0 0
Holloway Bros.	17,054 0 0	1,838 0 0
H. Lovatt	17,054 3 7*	728 17 4*

* Recommended by the Works Committee for acceptance.

LONDON.—For removing iron building from the site of the new school in Plough-road, Clapham Junction, to the site in Eardley-road, Streatham, for the School Board for London. Mr. T. J. Bailey, Architect :—

T. Cruwys	£200 0 0	Croggon & Co., Ld.*	£158 10 0
Dixon, Isaac, & Co.	199 12 0		

* Recommended by the Works Committee for acceptance.

LONDON.—For alterations for new drains, sanitary and hot-water arrangements, &c., at 59, Gloucester-terrace. Messrs. Christopher & White, architects :—

H. R. Anderson	£166 17 0	G. N. Watts	£164 13 0

LONDON.—For alterations, &c., of the "Merlin's Cave," Rosoman-street, E.C., for Mr. Alfred Mayer. Mr. A. Allen, jun., architect, 12, City-road, Finsbury, E.C. :—

Archer	£220 0	Dearing & Son*	£211 0
Little & Senecal	215 10		

* Accepted.

PENRHYNDEUDRAETH.—For the erection of an explosive magazine on Rhiwgoch Farm, for Mr. James R. Watson. Messrs. Andreas Roberts, Blaenau Festiniog, and Richard Pritchard, Penrhyndeudraeth, North Wales, architects :—

Richard Ellis Jones	£137 0 0
Owen Lewis Williams, *Joiner* / Isaac Humphreys, *Slater* / Wm. Morris, *Mason*	122 3 0
John Parry Jones, Penrhyndeudraeth*	118 0 0

* Accepted.

ROSSETT (Denbighshire).—For taking down the present parish church and erecting new one. Messrs. Douglas & Fordham, architects, 6, Abbey-square, Chester. Quantities by the architects :—

A. Bleakley	£4,600 0 0	Parker Bros.	£4,075 0 0
Peter Edwards	4,100 0 0	Davies Bros.	3,965 0
Hughes & Owen	4,100 0 0		

ROTHWELL.—For supplying and erecting an iron water-tank, supply of water mains, and foundation work, for the Local Board. Mr. L. Starkie, surveyor, Rothwell, Leeds :—

Tank.

E. & H. Hayly	£325 0 0
John Walker	320 0 0
The Stockton Forge Company	315 0 0
Harrison & Hammond, Wakefield*	295 0 0

4½ *Pipes.*

The Stavely Iron Company	5 10 0
E. & H. Hayly, Bradford*	5 2 6
John Walker	5 0 0

7½ *Foundation Work, per ton.*

Chapman Brothers, Rothwey*	85 14 0

* Accepted.

SHAPINSHAY (Orkney).—For erecting church for the United Presbyterian Congregation, Shapinshay, Orkney. Mr. T. S. Peace, architect, Kirkwall :—

W. B. Peace & Son, Kirkwall	£729 4 4

TOTTENHAM.—For the erection of Sunday School Class-room, dwelling-house, &c., in Mitchley-road, Tottenham, for the Committee of the Buildings Fund of St. Mary's, Tottenham. Mr. J. W. Couchman, architect, Tottenham :—

	A.	B.	C.
T. Bentley	£1,541	£1,568	£1,544
T. Tyerman	1,255	1,319	1,275
A. Porter	1,139	1,230	1,183
H. Knight & Son	1,084	1,159	1,124*

A. Portland cement dressings and oak fence. B. Bath stone dressings. C. Bath stone dressings and oak fence.
* Accepted.

TOTTENHAM.—For the erection of houses Vartry-road, Tottenham. Mr. E. C. Homer, architect, 99, Gresham-street, E.C. :—

D. G. Horlock (accepted)	£1,224

TUNBRIDGE WELLS (Kent).—For the erection of new end pavilion block at the Union Workhouse, Tunbridge Wells, for the Guardians of the Tonbridge Union. Mr. W. Oakley, architect, 36, Mount Pleasant, Tunbridge Wells. Quantities by Mr. Thos. Ladds, of Tunbridge Wells :—

C. J. Gallard	£3,767 0 0	G. & F. Penn	£3,317 17 0
F. Stevens	3,748 10 0	G. Denne & Son	3,300 0 0
E. G. Saxby	3,673 17 0	G. E. Wallis & Son	3,234 0 0
Herbert Stiff	3,550 0 0	G. J. Jones, Tonbridge (accepted)	3,142 1 10
Davis & Leaney	3,384 0 0	E. Thurbon	3,090 0 0
Richd. Avard	3,318 0 0		

WATFORD.—For new cricket pavilion, for the West Herts Cricket and Football Club Committee. Messrs. Ayres & Ardron, architects, 52, High-street, Watford :—

Judge	£975	Dove	£785
Neal	897	Turner, Limited	784
Eames	887	Wiggs	780
Andrews	876	Waterman	769
Clifford & Gough	849	Allen	725
Brightman	835		

New Premises, Hexham.—A list of tenders for new premises at Hexham has been received by us, but neither it nor the envelope which contained it bears any indication of the sender's name. We cannot insert lists of tenders or other items of news unless we know who sends them.

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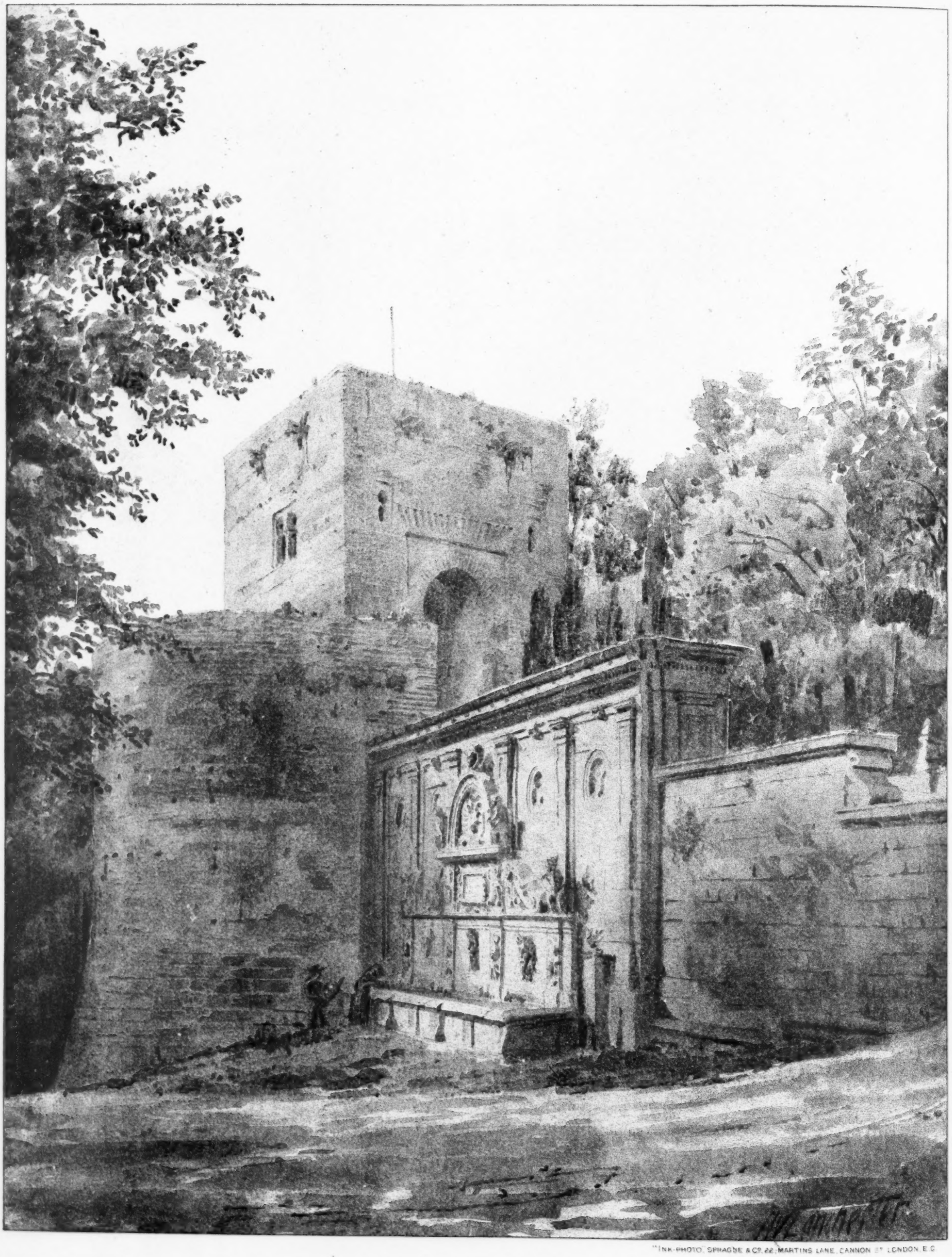

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FOUNTAIN OF CHARLES V., ALHAMBRA, GRANADA.—From a drawing by Mr. H. V. Lanchester, A.R.I.B.A.

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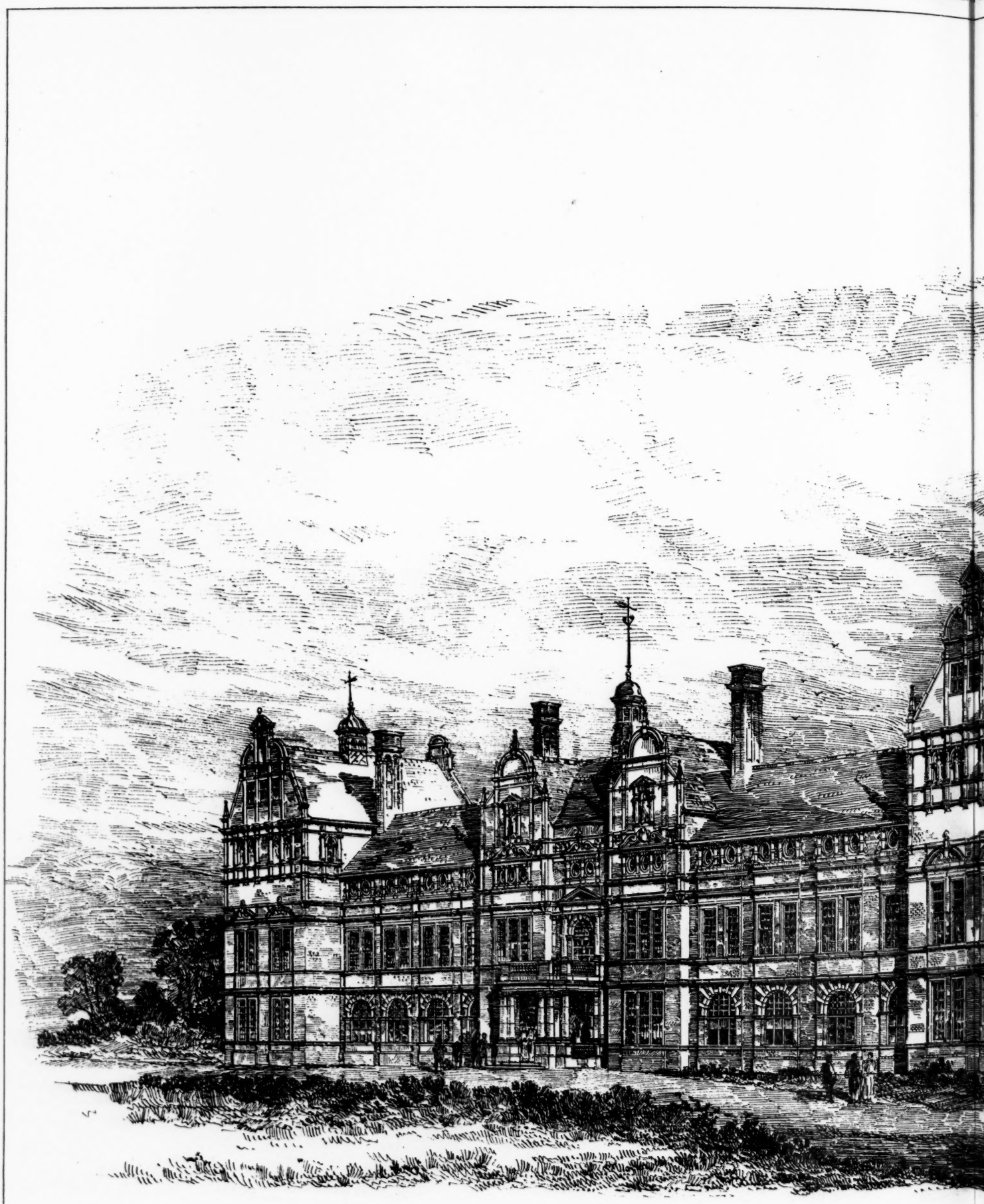


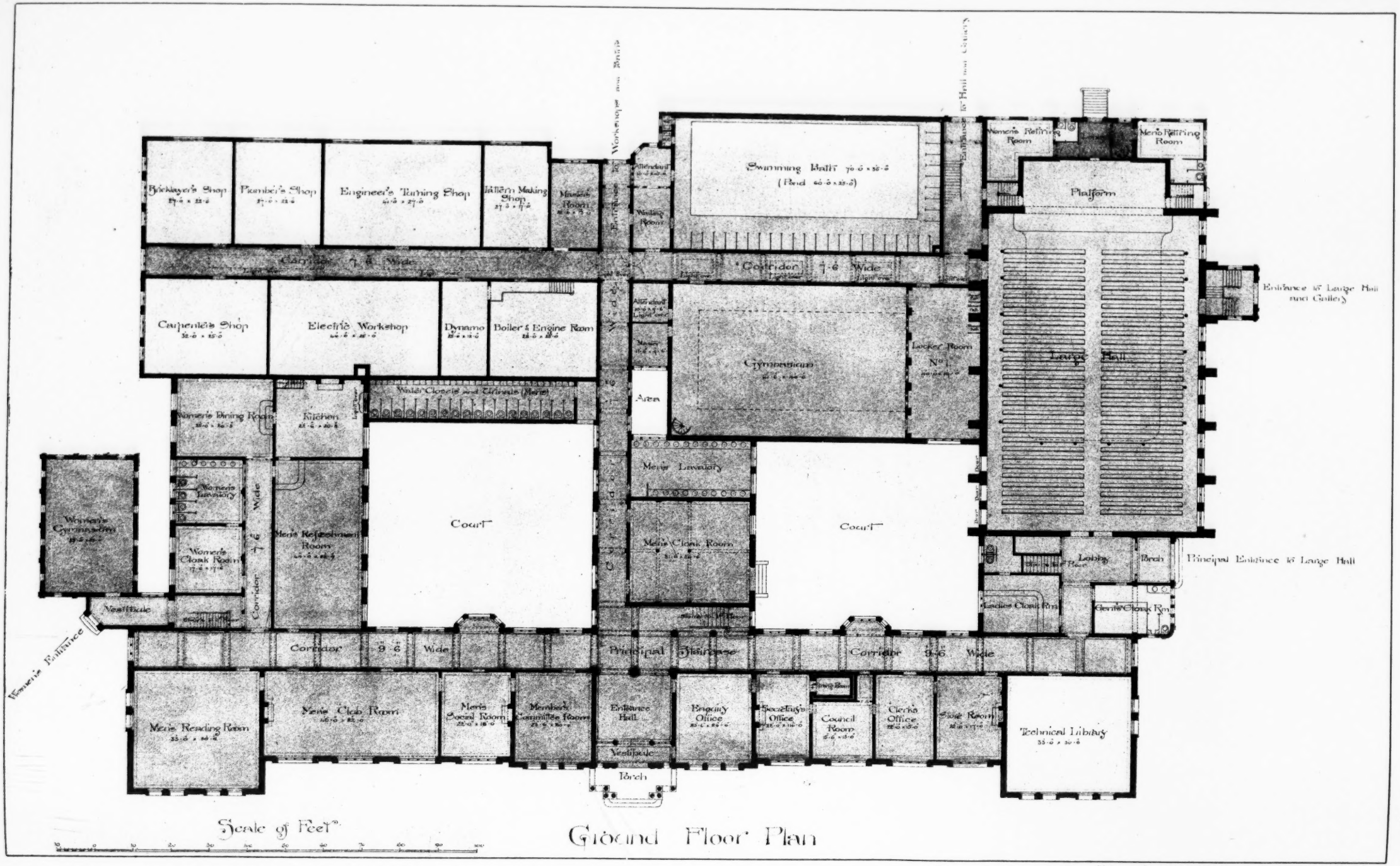
SELECTED DESIGN FOR BATTERSEA POLYTECHNIC

PERSPECTIV

PHOTO-LITHO. SPRAGUE & Co. 32 MARTINS LANE CANNON ST. LONDON E.C.

CHNIC INSTITUTE.—Mr. E. W. Mountford, F.R.I.B.A., Architect.

RSPECTIVE VIEW.



Scale of Feet.

Ground Floor Plan

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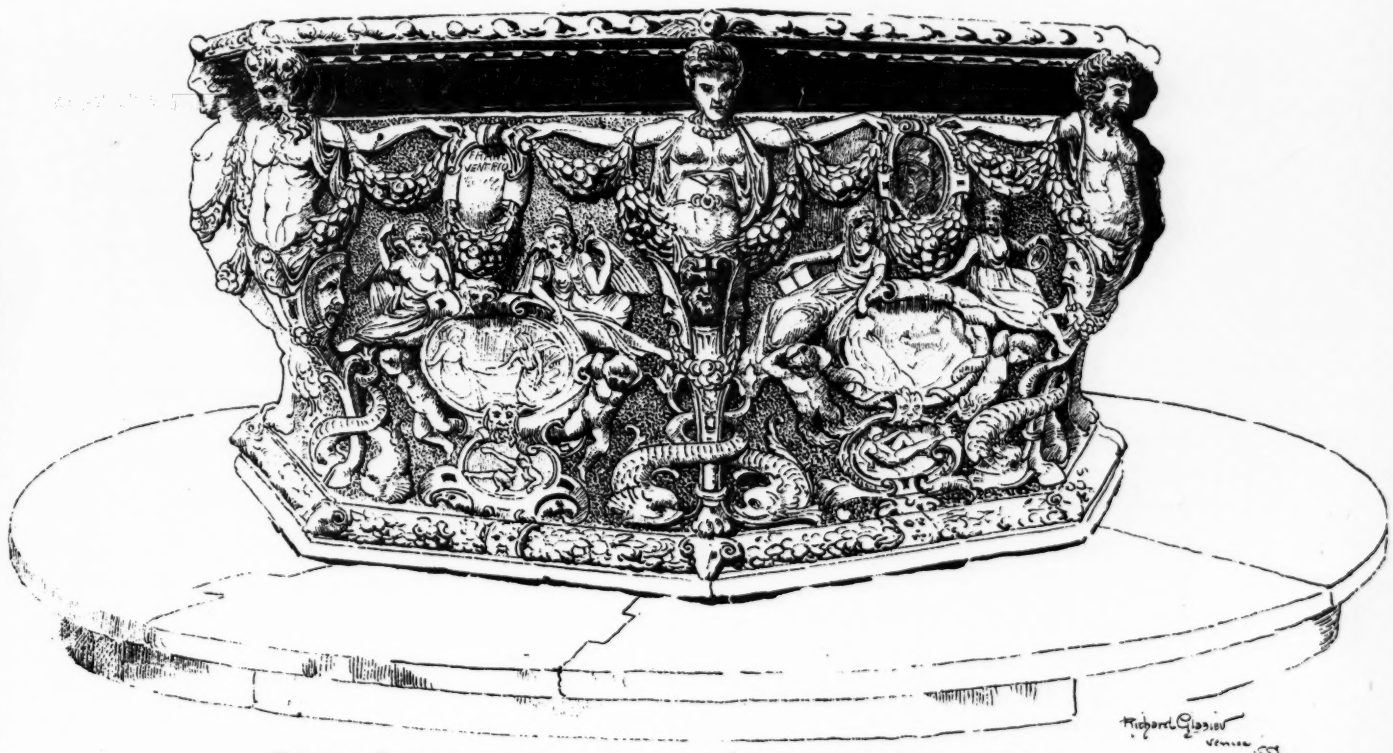
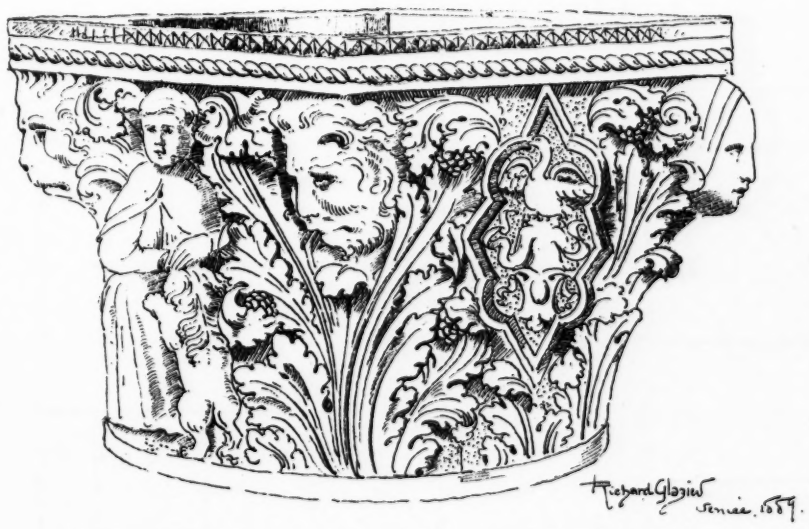
SELECTED DESIGN FOR BATTERSEA POLYTECHNIC INSTITUTE.—Mr. E. W. Mountford, F.R.I.B.A., Architect.



BRONZE CISTERN OR WELL HEAD BY ALFONSO ALBORGHETTI. 1559.

IN THE COURTYARD OF THE DOGE'S PALACE. VENICE.



Marble Well-Head from S.S. Giovanni Paolo. Now in the Museum. Venice.

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ITALIAN WELL-HEADS: RENAISSANCE.

SWEDISH HOUSES OF PARLIAMENT AND BANK O

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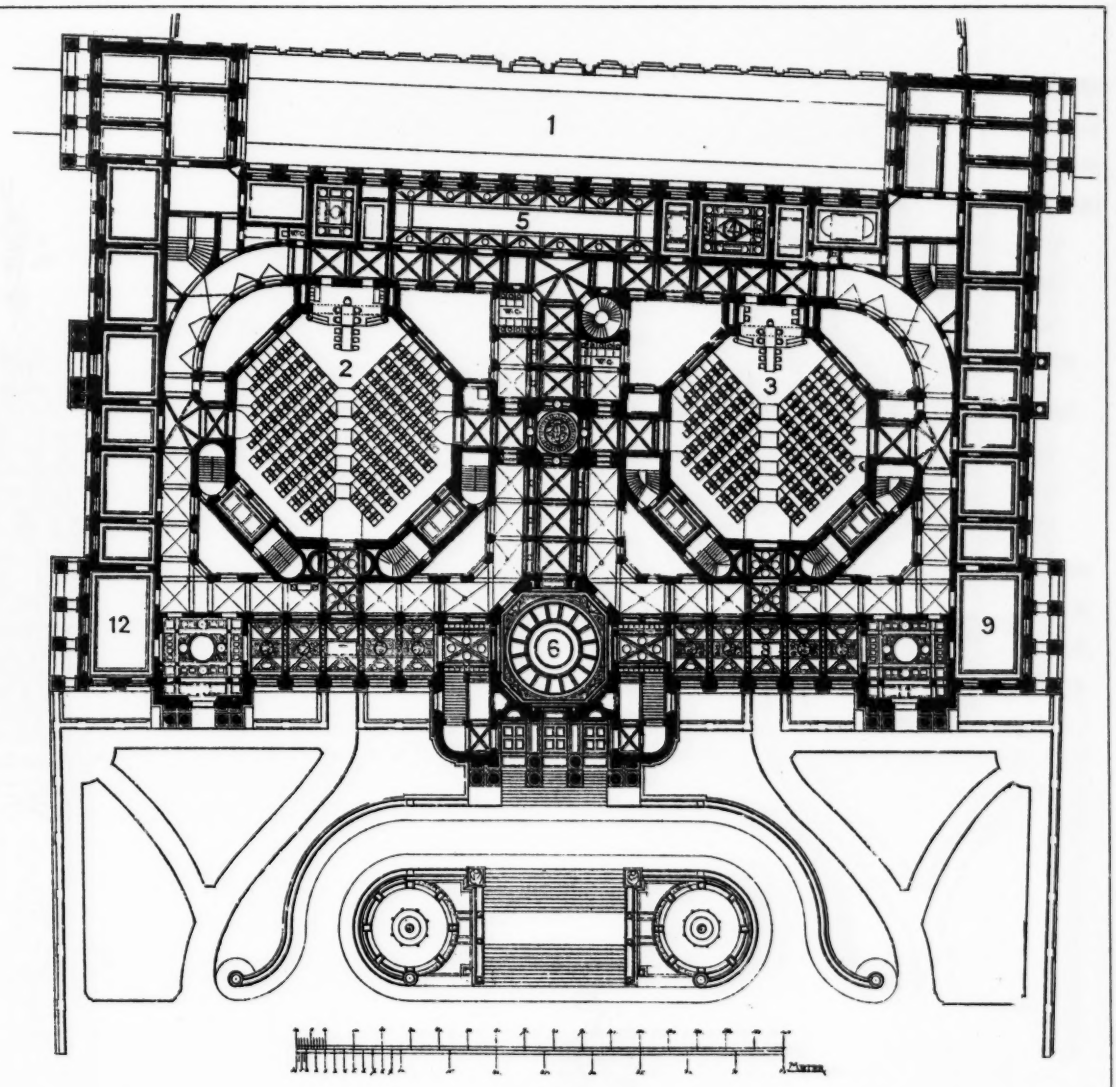
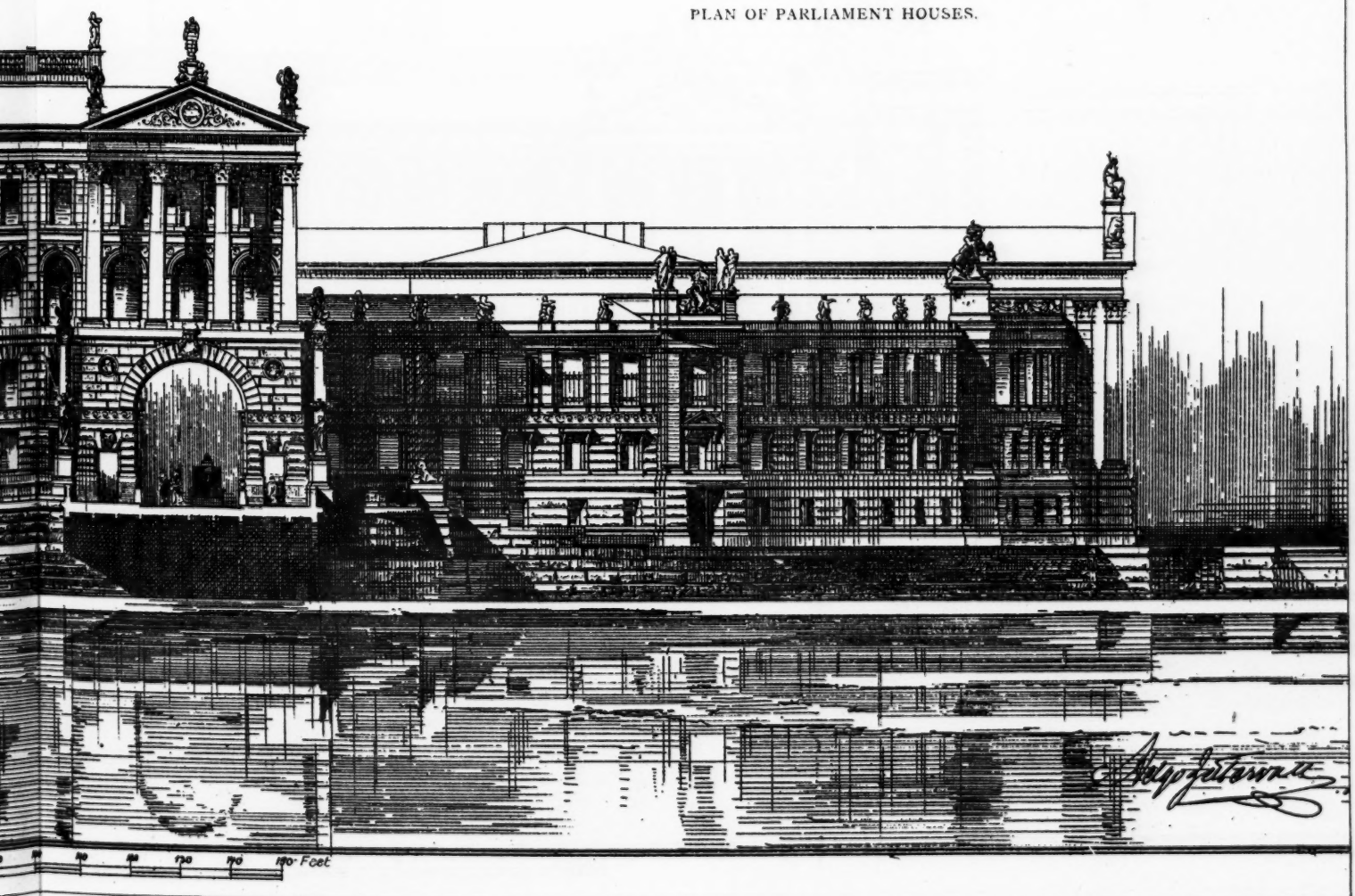


PLAN OF PARLIAMENT HOUSES.



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BANK OF SWEDEN.—Herr Helgo Zettervall, Architect.
DE ELEVATION.

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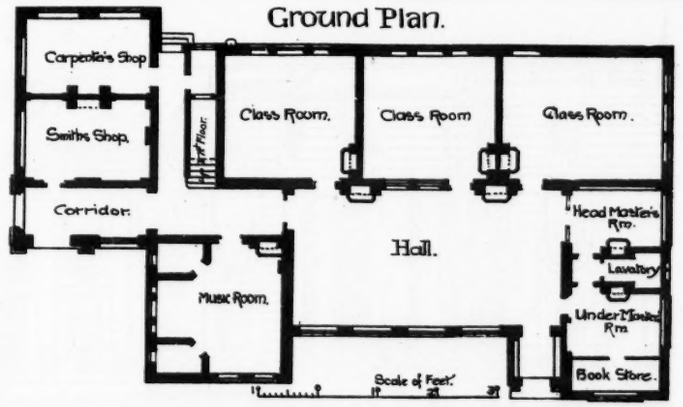
SWEDISH HOUSES OF PARLIAMENT AND BANK OF SWEDEN.—HERR HELGO ZETTERVALL, ARCHITECT.

PRINCIPAL ELEVATION.



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